

THE ERIGONINE SPIDERS OF NORTH AMERICA.
PART 3. THE GENUS *SCOTINOTYLUS* SIMON
(ARANEAE: LINYPHIIDAE)

A. F. Millidge

Little Farthing, Upper Westhill Road,
Lyme Regis, Dorset DT7 3ER, England

ABSTRACT

A revision has been carried out of the North American members of the genus *Scotinotylus* Simon. The generic names *Caledonia* Cambridge, *Cervinargus* Vogelsanger, *Cheraira* Chamberlin, *Cochlembolus* Crosby, *Coreorgonal* Crosby and Bishop and *Yukon* Chamberlin and Ivie are synonymized with *Scotinotylus*. *Araeonus patellatus* Emerton, *Ceratinopsis eutypa* Chamberlin, *Disembolus apache* Chamberlin and "*Erigone*" *bodenburgi* Chamberlin and Ivie have been transferred to *Scotinotylus*, while *Cochlembolus sacerdotalis* Crosby and Bishop and *Cochlembolus provo* Chamberlin have been excluded from the genus. *Scylaceus divisus* Chamberlin is a synonym of *Scotinotylus vernalis* (Emerton), *Cheraira willapa* Chamberlin is a synonym of *Scotinotylus monoceros* (Simon), and *Spirembolus chera* Chamberlin and Ivie and *Cheraira salmonis* Chamberlin are synonyms of *Scotinotylus sanctus* (Crosby). The revised genus *Scotinotylus* has been defined chiefly on the structures of the male palpal organs and the female epigyna; synapomorphic genitalic characters have been identified. The genus contains 34 species in North America, including the following 17 new taxa: *Scotinotylus ambiguus*, *S. bicavatus*, *S. bipoculatus*, *S. boreus*, *S. crinitus*, *S. dubiosus*, *S. exsectoides*, *S. gracilis*, *S. humilis*, *S. magnificus*, *S. montanus*, *S. petulcus*, *S. pollucis*, *S. regalis*, *S. sacratus*, *S. sagittatus* and *S. sintalutus*. The genus is subdivided into three species groups, the *antennatus*, *kenus* and *monoceros* groups. Members of the genus are distributed throughout the cooler latitudes of the northern hemisphere, but the majority of the species appear to be endemic to North America. Descriptions, diagnoses and distribution maps are given for each species.

INTRODUCTION

The genus *Scotinotylus* was erected by Simon (1884) for the two European species *Erigone antennata* Cambridge and *Erigone alpigena* L. Koch. In the present revision of the North American species of this genus, the generic names *Caledonia* Cambridge 1894, *Cochlembolus* Crosby 1929, *Coreorgonal* Bishop and Crosby 1935, *Cervinargus* Vogelsanger 1944, *Yukon* Chamberlin and Ivie 1947 and *Cheraira* Chamberlin 1948 are considered to be junior synonyms of *Scotinotylus*; the reasoning in support of this hypothesis is given later in this paper.

Most of the material examined in this revision was loaned by the American Museum of Natural History, New York (AMNH), but a number of specimens were also supplied from the Museum of Comparative Zoology, Harvard University (MCZ) and the Canadian National Collection, Ottawa (CNC).

GENUS *SCOTINOTYLUS* SIMON

Scotinotylus Simon 1884:502 (type species *Erigone antennata* Cambridge: "first species rule")

Scotynotylus: Roewer 1942:686 (this is not Simon's original spelling)

Caledonia Cambridge 1894:23. NEW SYNONYMY. (Type species *C. evansi* Cambr. by monotypy)

Cochlembolus Crosby 1929:79. NEW SYNONYMY. (Type species *Dismodicus alpinus* Banks by original designation)

Coreorgonal Bishop and Crosby 1935:217. NEW SYNONYMY. (Type species *Delorhipis bicornis* Simon by original designation)

Cervinargus Vogelsanger 1944:175. NEW SYNONYMY. (Type species *C. prominens* Vogelsanger (= *Tiso* (?) *clavatus* Schenkel) by original designation)

Yukon Chamberlin and Ivie 1947:52. NEW SYNONYMY. (Type species *Y. majesticum* Chamb. and Ivie by original designation)

Cheraira Chamberlin 1948:518. NEW SYNONYMY. (Type species *C. kena* Chamb. by original designation)

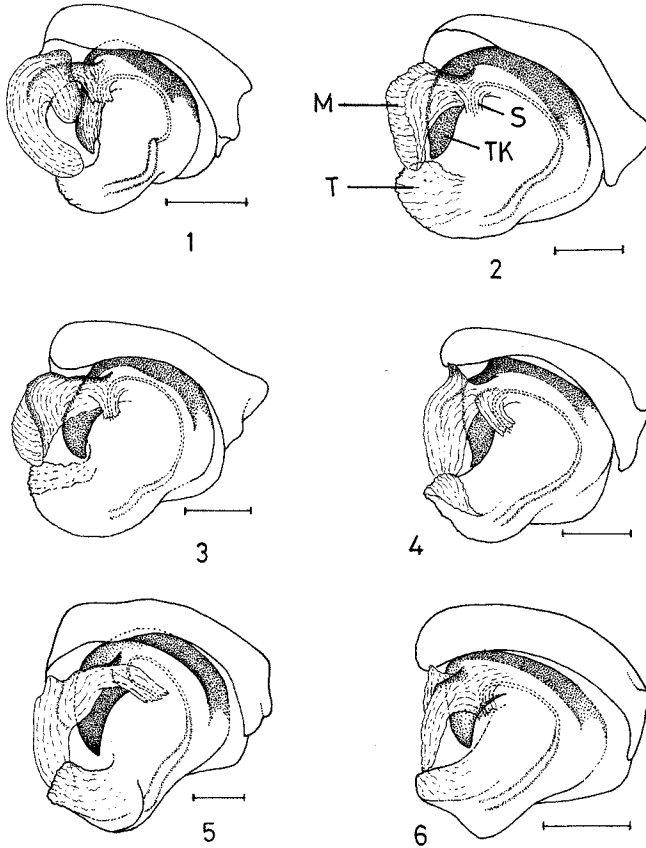
The members of this genus are small spiders with a total length of 1.2-3.0 mm. The female carapace is slightly elevated behind the eyes (Fig. 24) but is otherwise unmodified. The male carapace exhibits a diversity of forms, and in some species exaggerated lobes are present (e.g. Figs. 53, 86, 145). Those species which have a definite dorsal lobe usually have holes and sulci behind the lateral eyes, and the lobe in most cases does not carry the posterior median eyes (e.g. Fig. 39). In the type species, however, the rather shallow lobe carries the posterior median eyes, and lateral holes and sulci are absent (Fig. 17). All the species have files on the lateral margins of the chelicerae in both sexes. The abdomen is without scuta and is more or less unicolorous; there are clear striations on the epigastric plates in some species, particularly in the males. The legs in most species are relatively short and stout, with a value for tibia I 1/d (female) of 4.5-6; the larger species, however, tend to have somewhat thinner legs. In all species except one the tibial spines are 2221 in the female, usually reduced in number in the male; in *S. formicarius* (Dondale and Redner) the spines are 1111 in both sexes. The males of many of the species have short curved hairs dorsally on tibiae I and metatarsi I, as in *Spirembolus* Chamberlin (Millidge 1980). Metatarsi I-III have a dorsal trichobothrium, which is absent on metatarsus IV; the value of TmI lies in the range 0.35-0.70, but in the majority of species it is 0.35-0.55. In most of the species the male palpal patella is fairly short and unmodified, but in *S. monoceros* (Simon), *S. bicornis* Emerton and *S. petulcus*, new species, it is longer and swollen distally (Fig. 155). The male palpal tibia frequently bears one or more stout (thickened) spines dorsally. The tibial apophysis is usually fairly short, and frequently has a small tooth distally (e.g. Fig. 93), but in *S. monoceros*, *S. bicornis* and *S. petulcus* the apophysis is much longer and terminates in a hook (Fig. 155); there is a terminal hook also in the type species and in *S. eutypus* (Chamberlin), but in these species the apophysis is much shorter (Fig. 18). The female palpal tibia has 2 or 3 trichobothria dorsally; the male palpal tibia has 2.

The characters given above are rather similar to those of the genus *Spirembolus*, and do not serve to distinguish *Scotinotylus* from related genera. In common with the majority of erigonine genera, therefore, a more exact definition of the genus must be based on the structure of the genitalia.

The paracymbium of the male palp has a simple horseshoe shape in most species (e.g. Fig. 25), but is slightly more complex in a few species. In most cases the tegulum has an anterior projection which is distally whitish and somewhat membranous (e.g. T, Figs. 2, 9). The embolic division (ED) is composed of a spiral embolus of two, or more turns

arising from a screw-like or tightly coiled tailpiece (e.g. Figs. 19, 83, 110). In four species (*S. alienus* (Kulczynski), the European species *S. evansi* (Cambridge), *S. protervus* (L. Koch) and *S. kenus* (Chamberlin)) there is a pointed apophysis arising from (or near) the first coil of the embolus (Figs. 45, 68, 94), and in *S. regalis*, new species, there is a lamellar apophysis arising from the base of the embolus (L, Fig. 90). The distal end of the embolus is normally simple, but in *S. protervus* the embolus terminates in a small loop (Figs. 67, 68).

The supratégular apophysis (SA) is composed of (i) a weakly sclerotized tusk-like part of fairly constant form, which runs ventrad from the supratégulum (TK, Figs. 2, 9, 11); and (ii) a translucent membraneous part of variable form which arises from the mesal side of the "tusk" (M, Figs. 2, 9, 11). The membraneous stalk (S, Figs. 2, 9), which carries the seminal duct to the ED, is virtually a continuation of the membraneous part of the SA. The distal portion of the membraneous part has various forms. It may comprise a fairly simple sheet which lies across the anterior of the palp above the projecting tegulum (Figs. 1-6, 12-15), or it may be a lamella which is folded irregularly towards the ectal side (Figs. 8-11, 92, 108, 156). The range of variation of the SA within *Scotinotylus* (as here defined) is not regarded as excessive; some degree of variation within erigonine genera is



Figs. 1-6.—Male palpal organs, meso-ventral view, with embolic division removed to show supratégular apophysis: 1, *S. antennatus*; 2, *S. evansi*; 3, *S. alpinus*; 4, *S. majesticus*; 5, *S. protervus*; 6, *S. vernalis*. Abbreviations: M, membraneous part of supratégular apophysis; S, stalk; T, tegulum; TK, tusk-like part of supratégular apophysis (Scale lines 0.1 mm).

not unusual, e.g. in *Mecopisthes* Simon (Millidge 1977b), *Diplocephalus* Bertkau (Merrett 1963, Millidge 1977a) and *Walckenaeria* Blackwall (Merrett 1963).

The form of the ED in *Scotinotylus* is generally similar to that in *Spirembolus*, but the tailpiece shows small differences; the form of the SA is quite distinct from that in *Spirembolus*. The combination of the form of the ED with the form of the SA can be regarded as a derived palpal character unique to the species of *Scotinotylus*, and this synapomorphy supports the hypothesis that the genus is monophyletic.

The form of the epigynum is basically similar in all the species of the genus. Posteriorly there is outlined a roughly trapezoidal area, the "plate"; this narrows anteriorly to a median septum, which is clear in some species (e.g. Figs. 22, 95, 151) but less clear in others (e.g. Fig. 27). The markings visible on the epigynum, including the "plate", are the positions of the more heavily sclerotized parts and of the internal apodemal structures which carry the spermathecae and ducts. There is a hollow on either side of the septum, anterior to the "plate", and in these two cavities are situated the openings to the spermathecal ducts. The hollows are well developed and conspicuous in some species (e.g. Fig. 72) but rather obscure in others (e.g. Figs. 22, 27). In some species there is a median cusp-shaped knob (e.g. Fig. 55) or a linguiform process arising from the anterior margin of the epigynum; the "tongue" is well developed and conspicuous in a few species, e.g. *S. majesticus* Chamberlin and Ivie (Fig. 85) and *S. patellatus* (Emerton) (Fig. 61), but much shorter in others (e.g. Figs. 27, 31). Some species (those previously placed in *Cheraira*) have a cusp-shaped pocket on either side of the epigynum anterior to the "plate"; these cusps may be moderately large (Fig. 125) or very small (Fig. 127). It is perhaps worth noting that the median knob-like process mentioned above often carries within it a cusp-shaped hollow (Fig. 72).

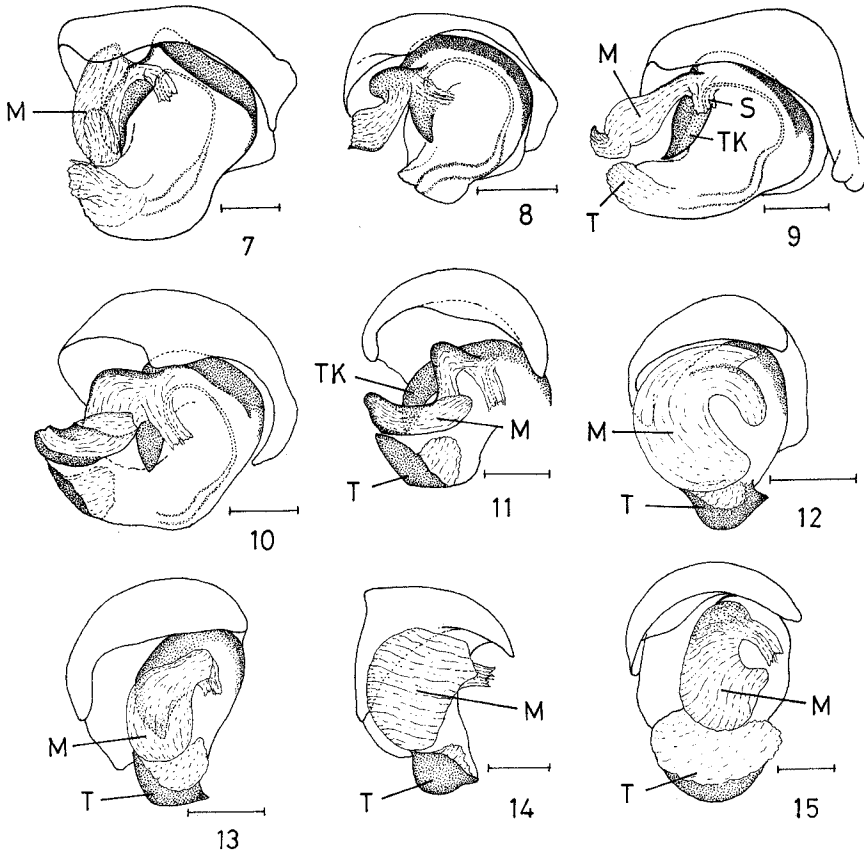
The internal genitalia of all the species have a similar basic plan. The spermathecal duct arises on the mesal side of the spermatheca, and for most of its course to the external opening it lies on the dorsal side of the spermatheca; the course followed by the duct may be relatively short and simple (Fig. 133) or longer and more sinuous (Figs. 73, 87). The external openings of the ducts are similarly placed to those of *Spirembolus*, and indeed the female of *Scotinotylus monoceros* has sometimes been mistaken for *Spirembolus mundus* Chamberlin (Millidge 1980). The arrangement of the ducts in *Scotinotylus* is however different from that in *Spirembolus*, where the duct follows a spiral course around the spermatheca.

The total structure of the female genitalia, namely the form of the external epigynum with the duct openings in the hollows on either side of the median septum, coupled with the general positioning of the ducts, can be regarded as a derived epigynal character which is common to all species of the genus. This synapomorphy offers additional support to the hypothesis that the genus is a monophyletic group.

Synonymy.—Previous to this paper it has already been suggested that *Cochlembolus* may be a junior synonym of *Caledonia* (Holm 1950), that *Cheraira* may be a synonym of *Caledonia* (Bragg and Leech 1972), and that both *Cochlembolus* and *Caledonia* are probably junior synonyms of *Scotinotylus* (Millidge 1977a). In the present paper, *Caledonia*, *Cochlembolus*, *Yukon*, *Cheraira* and *Coreorgonal* are regarded as junior synonyms of *Scotinotylus*; *Cervinargus*, already a junior synonym of *Cochlembolus* (Thaler 1970), likewise falls into synonymy with *Scotinotylus*. All the species previously placed in these genera have basically similar male and female genitalia. Both sexes of *Araeoncus patellatus* Emerton have the genitalia of this same form, and this species is also transferred to *Scotinotylus*. The three species *Ceratinopsis eutypa* Chamberlin, *Disembolus apache*

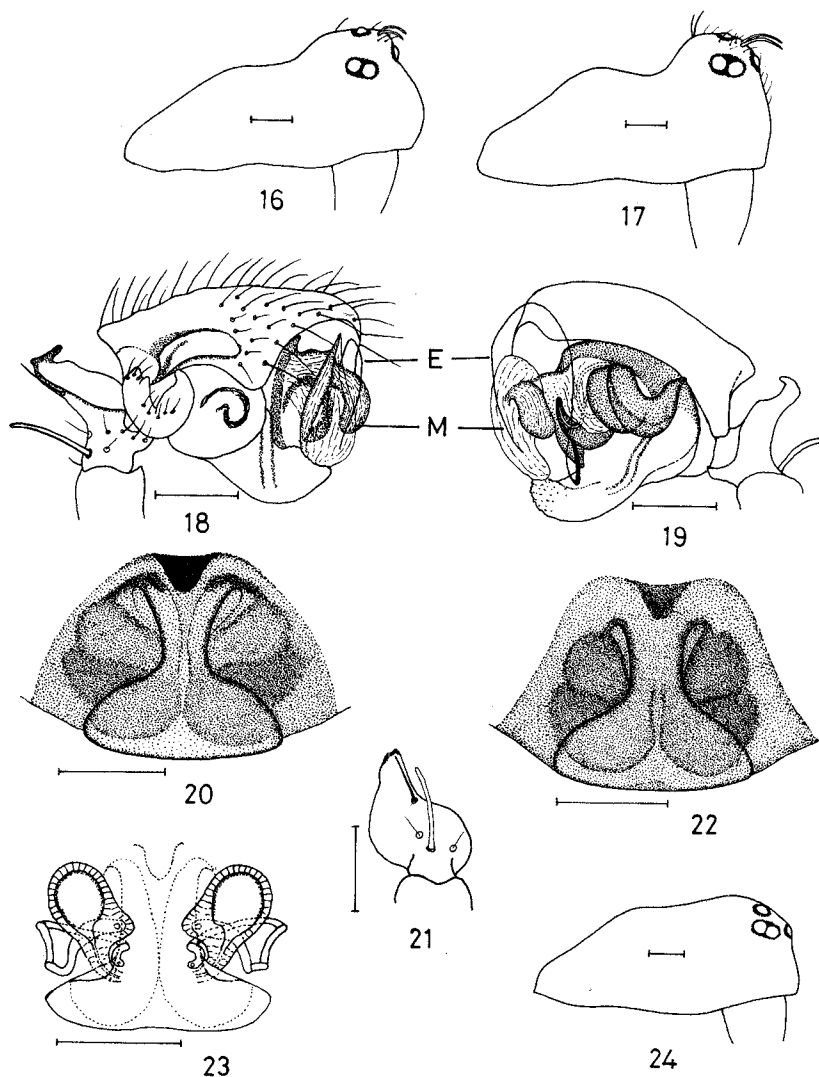
Chamberlin and "*Erigone*" *bodenburgi* Chamberlin and Ivie have been transferred to *Scotinotylus* on the basis of their epigyna. The figure of the epigynum of *Scironis autor* Chamberlin (1948) indicates that this species probably belongs in *Scotinotylus*, but it has not been possible to include it in this study since the unique specimen on which the species was based cannot be located.

The palpal organs of *Caledonia evansi* (the type of *Caledonia*) (Figs. 44, 45) are very similar to those of *Scotinotylus antennatus* and its sibling *S. eutypus* (Figs. 18, 19), differing only in the shorter and stouter embolus in *Caledonia* and in a small difference in the membraneous part of the SA (Figs. 2, 13 cf. Figs. 1, 12). The palpal organs of *Cochlembolus sacer* Crosby (Fig. 26) and *C. pallidus* Emerton are very close indeed to those of *S. antennatus*, with the embolus long and thin distally and with the SA membrane very similar. The palpal organs of *Cochlembolus alpinus* (Banks) (the type of *Cochlembolus*) (Figs. 3, 51, 52), *C. vernalis* (Emerton) (Figs. 6, 74) and *Araeoncus patellatus* (Figs. 58, 59) are closely similar to those of *Caledonia evansi*. Apart from a minor difference in the form of the tailpiece, the palpal organs of *Yukon majesticum*



Figs. 7-15.—Male palpal organs, with embolic divisions removed to show suprategular apophysis: 7, *S. formicarius*, meso-ventral; 8, *S. sanctus*, meso-ventral; 9, *S. monoceros*, meso-ventral; 10, *S. kenus*, meso-ventral; 11, *S. kenus*, anterior view; 12, *S. antennatus*, anterior view; 13, *S. evansi*, anterior view; 14, *S. majesticus*, anterior view; 15, *S. formicarius*, anterior view. Abbreviations: M, membraneous part of suprategular apophysis; S, stalk; T, tegulum; TK, tusk-like part of suprategular apophysis (Scale lines 0.1 mm).

Chamberlin and Ivie (Figs. 4, 14, 82, 83) are also similar to those of *Caledonia evansi*. The *Cheraira* species (which included *C. salmonis* Chamberlin, a junior synonym of *Cochlembolus sanctus* Crosby: see description of latter species later in this paper) have the ED of the same general form as that of *Scotinotylus antennatus* and *Caledonia evansi*, but with the SA membrane differently shaped. The type species of *Cheraira* (*C. kena* Chamberlin) shares with *Caledonia* the character of a sclerotized tooth present on the basal coil of the embolus. *Cochlembolus formicarius* Dondale and Redner has the epigynum similar to those of the *Cheraira* species (presence of cusps) but the SA membrane closer to *Caledonia* than to *Cheraira*.



Figs. 16-24.—16, *S. eutypus*, male carapace, lateral; 17, *S. antennatus*, male carapace lateral; 18, *S. eutypus*, male palp, ectal; 19, *S. eutypus*, male palp, mesal; 20, *S. eutypus*, epigynum; 21, *S. eutypus*, male palpal tibia, dorsal; 22, *S. antennatus*, epigynum; 23, *S. antennatus*, internal genitalia, female, ventral; 24, *S. eutypus*, female carapace, lateral. Abbreviations: E, embolus; M, membraneous part of suprategular apophysis. (Scale lines 0.1 mm).

The *Coreorgonal* species have the ED of the same spiral form, but with the tailpiece slightly more complex distally (Figs. 157, 158); the SA is of the same basic form (Fig. 9), with the SA membrane fairly similar to that of *Cheraira*. The *Coreorgonal* males show greater differences from the other species in the following respects, however: (i) the tibial apophysis is much longer; (ii) the palpal patella is longer and swollen distally; (iii) there is a white excrescence between palpal patella and tibia, rather similar to that present between femur and patella in some species of *Spirembolus*; and (iv) the form of the male carapace is different, with a lobe or stalk arising from the clypeal region. It is arguable whether these differences would justify the retention of *Coreorgonal* as a separate genus. The form of the tibial apophysis can certainly vary a good deal within a genus, while the lengthening of the palpal patella occurs in isolated species in several other genera (e.g. *Erigone* Audouin, *Diplocephalus*, *Spirembolus*). The excrescence between palpal patella and tibia is not necessarily of generic significance, since in the genus *Spirembolus* a somewhat similar excrescence is present in only a few otherwise typical species. The form of the male carapace can certainly show considerable variations within a genus, but it must be admitted that the form exhibited by *Coreorgonal* is very unusual.

As mentioned earlier in this paper, the female genitalia of all the species under consideration are basically similar. Comparison of Fig. 47 (*Caledonia*) with Fig. 85 (*Yukon*) shows a clear similarity in form, the main difference being that the "tongue", which is vestigial in *Caledonia*, is highly developed in *Yukon*. The epigynum of *Araeonus patellatus*, with its fairly long narrow "tongue" (Fig. 61), is in other respects close to those of *Caledonia* or *Cochlembolus sacer* (Fig. 27). It seems probable that the lengthening or shortening of the "tongue," or its complete disappearance as in *Cheraira* and *Coreorgonal*, is of secondary importance. The presence on the epigyna of the *Cheraira* species of "cusps," which in some species are very small, is probably also of secondary importance. The wavy outline of the internal apodemal structure which gives a characteristic appearance to the epigynum of *Cochlembolus sacer* (Fig. 27) is also present in two *Cheraira* species (Figs. 128, 130). Apart from the absence of "cusps," the *Coreorgonal* species have the genitalia very similar to those of the *Cheraira* species. The *Coreorgonal* epigynum (Fig. 151) is also generally similar to that of the European species *Scotinotylus alpigena* (L. Koch) (Fig. 50), apart from the presence of the vestigial "tongue" in the latter species. The internal genitalia of all the species, including the *Coreorgonal* species, have the same basic pattern.

On the basis of these data and considerations, it seems best to recognize the close relationships which clearly exist between the species placed in *Scotinotylus*, *Caledonia*, *Cochlembolus*, *Yukon*, *Cheraira* and *Coreorgonal* by uniting them into one genus: *Scotinotylus* Simon 1884 has priority. It must be admitted that the inclusion of the *Coreorgonal* species in this enlarged genus may be open to some question, but on balance, taking particularly into account the structures of the male and female genitalia, it seems a reasonable hypothesis to regard the three closely related species concerned as a slightly aberrant branch of *Scotinotylus*.

Some arachnologists might prefer to retain certain of the smaller genera, in particular *Scotinotylus*, *Cheraira* and *Coreorgonal*. It is clear from the data presented, however, that the distinctions between these genera would be somewhat diffuse and ambiguous, and the genera would have to be defined and differentiated on the basis of small differences in the form of the SA membrane and on small differences in the female genitalia. If such minor variations from the type were to be regarded as generically significant in the present case, then consistency might demand the fragmentation of many commonly used erigone genera into smaller genera, which I would regard as a distinctly retrograde step.

Species and species groups.—The genus *Scotinotylus* as defined in this paper contains 34 species in North America. It is helpful, for taxonomic purposes, to split this rather large genus into smaller groupings, which in the present state of knowledge are preferably designated as species groups rather than as sub-genera. The species groups are defined as follows:

1. The *antennatus* group comprises the species with the following characters: the SA of the male palp is distally a flattish membrane as shown in Figs. 1, 2, 12, 13; the epigynum has a cusp-like knob on the anterior margin (e.g. Fig. 20) or a tongue-like process (short or long) which arises from the anterior part of the epigynum (e.g. Figs. 31, 61) (exception *S. ambiguus*); the female palpal tibia has 2 trichobothria dorsally; the species occur widely over N. America.

In the absence of the male, the placing of *S. ambiguus* in this group is provisional.

2. The *kenus* group comprises the species with the following characters: the SA of the male palp is of the form shown in Figs. 8, 10, 11, 98, 108 (exception *S. formicarius*); the epigynum has a "cusp" on either side anteriorly; the female palpal tibia has 3 trichobothria dorsally (one may be very small or occasionally absent); the species are limited to the western half of N. America.

3. The *monoceros* group comprises the species with the following characters: the SA of the male palp is of the form shown in Fig. 9; the palpal patella is long and swollen distally (Fig. 155); the male carapace has a lobe or stalk arising from the clypeus (Figs. 145, 146, 147, 148); the epigynum has neither a tongue-like process nor "cusps" (Fig. 151); the female palpal tibia has 3 trichobothria; the species are limited to the western side of N. America.

The species dealt with in this paper are as follows:

antennatus species group

- Scotinotylus eutypus* (Chamberlin)
- S. sacer* (Crosby)
- S. pallidus* (Emerton)
- S. sacratus*, new species
- S. alienus* (Kulczynski)
- S. alpinus* (Banks)
- S. patellatus* (Emerton)
- S. gracilis*, new species
- S. protervus* (L. Koch)
- S. vernalis* (Emerton)
- S. exsectoides*, new species
- S. majesticus* (Chamberlin and Ivie)
- S. magnificus*, new species
- S. regalis*, new species
- S. ambiguus*, new species

kenus species group

- S. kenus* (Chamberlin)
- S. castoris* (Chamberlin)
- S. pollucis*, new species
- S. sanctus* (Crosby)
- S. crinitus*, new species
- S. montanus*, new species
- S. humilis*, new species

- S. bicavatus*, new species
- S. bipoculatus*, new species
- S. boreus*, new species
- S. sintalutus*, new species
- S. dubiosus*, new species
- S. apache* (Chamberlin)
- S. formicarius* (Dondale and Redner)
- S. bodenburgi* (Chamberlin and Ivie)
- S. sagittatus*, new species
- monoceros* species group
 - S. monoceros* (Simon)
 - S. bicornis* (Emerton)
 - S. petulcus*, new species

Misplaced species.—The following two species do not belong in *Scotinotylus*:

Cochlembolus sacerdotalis Crosby and Bishop 1933:167. This species has been transferred to *Disembolus* Chamberlin and Ivie, and will be dealt with in Part 4 of this series of papers.

Cochlembolus provo Chamberlin 1948:522. Examination of the type female (AMNH) shows clearly that this species is not a member of the genus *Scotinotylus*.

Keys to species.—The genus contains several groups of closely related species which may exhibit only small structural differences. Partial keys to the species are presented in Tables 1 and 2; in all cases, the species descriptions and diagnoses should be referred to before a final identification is made.

Distribution and Natural History.—The genus *Scotinotylus* (as defined in this paper) is widely distributed throughout the cooler regions of the northern hemisphere, but the majority of the known species appear to be endemic to North America. It is possible that North America represents the area of origin of the genus, and that those few species which are to be found outside North America have resulted from migrations from this focal area.

The type species *S. antennatus* is known only from the European Alps and the Carpathians (Tatra Mountains), while its sibling species *S. eutypus* is known only from north-western America. Neither species has been found in such well searched areas as Greenland, Iceland, Scotland and Scandinavia. It seems not unlikely, therefore, that the dispersion route for this species pair has been from western North America via Asia to Europe. The European species *S. clavatus* (Schenkel), which is closely similar to *S. sacer* (Thaler 1970), is known from the European Alps only, while *S. sacer* is fairly widespread in north-western America and is also known from west Greenland (Holm 1967), but appears to be absent from Iceland and northern Europe. This suggests that the dispersion to Europe in this case also may have been via Asia. The distribution of the species pair *S. evansi*/*S. alienus* is however circumpolar, though there are as yet no records from eastern Canada; *S. evansi* has also reached the European Alps, where it is apparently uncommon (Thaler 1970).

Members of the genus have been collected from many parts of North America. The species seem on the whole to prefer the cooler climates of higher latitudes and/or altitudes, and there are no records from the south-eastern states of U.S.A. or from Mexico. Little has been recorded on the natural history of most of the species. Some sparse information indicates that they have the normal erigonine habits, and live at

Table 1.—Partial key to *Scotinotylus* species: males .

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1. Carapace elevated into a small lobe, with 2 short curved spines projecting from the ocular area (Fig. 16); there are no holes or sulci behind the lateral eyes
S. eutypus
 2. Carapace lacking holes and sulci, but elevated and projecting anteriorly, and clothed with numerous hairs (Figs. 46, 60, 71)
 - a. palpal tibia with 3 fairly stout spines
S. patellatus
 - b. palpal tibia lacking stout spines
S. protervus (*S. alienus* will also be keyed here)
 3. Carapace with lobe or stalk arising from the clypeus, in addition to any other lobes
 - a. carapace as in Fig. 145
S. bicornis
 - b. carapace as in Fig. 146
S. petulcus
 - c. carapace as in Figs. 147, 148
S. monoceros
 4. Carapace with distinct dorsal lobe, which has sulci and holes behind the lateral eyes (e.g. Fig. 28); an additional lobe may also be present
 - a. palpal tibia lacking stout spines
 - i. one large and one smaller lobes present (Fig. 86); palp Figs. 82, 83, 84
S. majesticus
 - ii. one large lobe and one tiny lobe present (Fig. 88)
S. magnificus
 - iii. a single large lobe present (Figs. 89, 99)
S. regalis, *S. pollucis* (separate by palps)
 - iv. a shallow lobe present (Fig. 76); palpal tibia Fig. 78
S. vernalis
 - b. palpal tibia with one stout spine (e.g. Fig. 92)
 - i. tibial apophysis fairly long and pointed (Fig. 142)
S. formicarius
 - ii. tibia with small black tooth on antero-ectal margin (e.g. Figs. 93, 112)
S. kenus, *S. sanctus*, *S. crinitus*, *S. montanus*, *S. humilis* (see species descriptions)
 - c. palpal tibia with 2-3 stout spines (e.g. Fig. 25)
 - i. clear epigastric striae present
S. pallidus
 - ii. epigastric striae absent or very indistinct
S. alpinus, *S. sacer*, *S. sacratus* (separate by palps and carapace lobes)
-

ground level under stones and in vegetable detritus; several species have been taken at the snow line. A few have been found in ants' nests.

Descriptions of the species.—The species are described in the order shown in the list given earlier. All figures of palps are of the right palp. The holotypes of the new species are deposited in AMNH, MCZ or CNC, as given under the species description.

Scotinotylus eutypus (Chamberlin), new combination

Figures 16, 18, 19, 20, 21, 24; Map 3

Ceratinopsis eutypa Chamberlin 1948:509 (female)

Scotinotylus antennatus: Bishop and Crosby 1938:55 (male) (not *S. antennatus* (Cambridge)); Bonnet 1958:3962 (in part); Roewer 1942:686 (in part)

Table 2.—Partial key to *Scotinotylus* species: females.

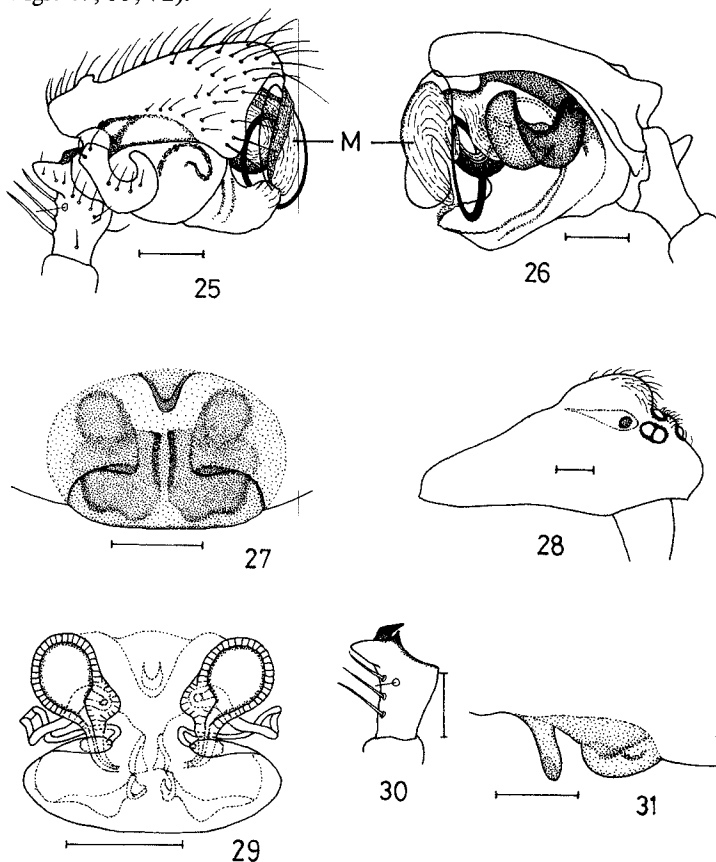
-
1. Epigynum with cusp-like knob arising from the anterior margin (e.g. Fig. 20); palpal tibia with 2 trichobothria
S. eutypus, *S. alpinus*, *S. alienus*, *S. protervus* (separate by epigyna)
 2. Epigynum with tongue-like process arising from the anterior region; palpal tibia with 2 trichobothria
 - a. process short, standing more or less erect from the anterior margin (Figs. 27, 31)
 - i. clear epigastric striae present
S. pallidus
 - ii. epigastric striae absent or very faint
S. sacer, *S. sacratus* (see species descriptions)
 - b. process longer, more or less prone
 - i. process long and broad (Figs. 85, 91)
S. majesticus, *S. magnificus*, *S. regalis* (see species descriptions)
 - ii. process short and broad (Figs. 77, 80)
S. vernalis, *S. exsectoides* (separate by epigyna)
 - iii. process long and narrow (Figs. 61, 65)
S. patellatus, *S. gracilis* (separate by epigyna)
 3. Epigynum not as 1. or 2., but with 2 "cusps" anteriorly (e.g. Figs. 122-132); palpal tibia usually with 3 trichobothria, one of which may be very small
 - a. tibial spines 1111; palpal tibia with 2 trichobothria
S. formicarius
 - b. tibial spines 2221
 - i. epigynum with points of cusps directed forwards (Figs. 131, 132)
S. bodenburgii, *S. sagittatus* (separate by epigyna)
 - ii. epigynum with points of cusps directed backwards (e.g. Fig. 122)
 Epigynum as Fig. 102
S. pollucis
 Epigynum of general form shown in Figs. 95, 122
S. kenus, *S. castoris*, *S. sanctus*, *S. crinitus*, *S. montanus*, *S. bicavatus*, *S. bipoculatus*, *S. boreus*, *S. sintalutus*, *S. dubiosus*, *S. apache* (see species descriptions)
 4. Epigynum with neither cusps nor tongue-like process
 - a. epigynum as Fig. 151
S. monoceros, *S. bicornis* (see species descriptions)
 - b. epigynum as Fig. 121
S. ambiguus
-

Type.—Female type from Rainier Park, Washington, August 9, 1929 (R. V. Chamberlin).

Description.—Chamberlin's specimens (including the type) of *Ceratinopsis eutypa* cannot be traced, but the epigynum (Chamberlin 1948: Fig. 36) agrees well with that of the specimen here described; the size quoted is also practically the same. The type locality of *C. eutypa* corresponds with the locality of the specimens described here. The male and female were taken together. Total length: female 2.0 mm, male 1.9 mm. Carapace: length: female 0.80 mm, male 0.85 mm. Orange-brown, with blackish markings and margins. The male carapace is raised into a small lobe anteriorly, and the clypeus projects distinctly (Fig. 16); there are 2 short curved horn-like spines in the ocular area. Abdomen: grey-black, epigastric plates smooth. Sternum: black. Legs: orange-brown. Tibial spines: female 2221, male 0021. TmI: female 0.36-0.38, male 0.40-0.45. Male palp: Figs. 18, 19, 21; the embolus is long and thin distally, and the tibia bears one stout

spine dorsally. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 20; heavily pigmented. The internal genitalia are probably very close to those of *S. antennatus* (Fig. 23).

Diagnosis.—This species closely resembles the European species *S. antennatus*, with which it was confused by Bishop and Crosby (1938). The two forms are here regarded as separate species because of the existence of small structural differences, reinforced by the probability that the North American and European populations have been genetically isolated from one another for a considerable period of geological time. The palpal organs and the tibial apophyses of the two species are virtually identical, but *S. eutypus* shows differences in the shape of the male carapace, and the horn-like spines are shorter (Fig. 16 cf. Fig. 17). The females of the two species are closely similar, and since only one female of *S. eutypus* has been examined it is uncertain whether the epigyna are distinguishable (Fig. 20 cf. Fig. 22). So far as the North American fauna is concerned, the male of *S. eutypus* can be diagnosed immediately by the form of the carapace, and confirmation is given by the form of the palp and palpal tibia (Figs. 18, 19). The female is diagnosed by the epigynum, which has a small dark colored cusp-shaped knob on the anterior margin, a character which groups this species with *S. alienus*, *S. alpinus* and *S. protervus*; from these three species, *S. eutypus* is distinguished without difficulty by the form of the epigynum (Fig. 20 cf. Figs. 47, 55, 72).



Figs. 25-31.—*S. sacer*: 25, male palp, ectal; 26, male palp, meso-ventral; 27, epigynum; 28, male carapace, lateral; 29, internal genitalia, female, ventral; 30, male palpal tibia, ectal; 31, epigynum, lateral. Abbreviation: M, membranous part of suprategular apophysis (Scale lines 0.1 mm).

Distribution.—This species is known from Washington, Oregon and British Columbia (Map 3); I have seen only specimens from Washington.

Natural History.—The species has been taken from near the snow line in Washington. Males and females have occurred in August and September.

Scotinotylus sacer (Crosby), new combination

Figures 25, 26, 27, 28, 29, 30, 31; Map 1

Cochlembolus sacer Crosby 1929:82; Roewer 1942:660; Bonnet 1956:1175; Holm 1967:14

Lophocarenum alpinum: Emerton 1915:150 (male only; not *Dismodicus alpinus* Banks)

Type.—Male holotype from Lake Louise, Alberta, August 4, 1927; in AMNH. The species has been so well described in the past (references above) that examination of the type was not considered to be necessary.

Description.—Total length: female 1.65-1.8 mm, male 1.7-1.8 mm. Carapace: length: female/male 0.75-0.80 mm. Deep brown to orange-brown, with faint dusky markings. The male has a rather shallow lobe, with a weak longitudinal furrow, and the clypeus projects (Fig. 28). Abdomen: pale grey to grey; epigastric plates smooth in both sexes. Sternum: orange, reticulated with black. Legs: orange-brown. Tibial spines: female/male 2221, but weak on legs I and II in male. TmI: female 0.36-0.40, male 0.40. Male palp: Figs. 25, 26, 30; the tibia has 3 stout spines dorsally, and there is a distinct knob on the ecto-dorsal side. Female palp: tibia with 2 trichobothria. Epigynum: Figs. 27, 31; the degree of pigmentation is variable; the markings within the posterior plate, though somewhat variable, always have the wavy outline shown. Internal genitalia: Fig. 29.

Diagnosis.—The male of *S. sacer* is grouped with *S. alpinus*, *S. pallidus* and *S. sacratus* by the single carapace lobe and the presence on the palpal tibia of 2-3 stout spines. From *S. alpinus*, *S. sacer* is separated by the form of the carapace, the lobe being considerably larger in *S. alpinus* (Fig. 28 cf. Fig. 53), by the palpal tibia (Figs. 25, 30 cf. Figs. 51, 54) and by the shorter and stouter embolus of *S. alpinus* (Fig. 26 cf. Fig. 52). *S. sacer* male is distinguished from *S. pallidus* by its normally larger size, by the somewhat greater projection of the clypeal region (Fig. 28 cf. Fig. 35), by the form of the palpal tibia which in *S. pallidus* lacks the ecto-dorsal knob present in *S. sacer* (Fig. 30 cf. Fig. 34), and by the presence in *S. pallidus* of clear epigastric striae. *S. sacratus* male has a larger carapace lobe than in *S. sacer* (Fig. 28 cf. Fig. 39), the lobe being somewhat similar to that of *S. alpinus*, and the palpal tibia of *S. sacratus* lacks the ecto-dorsal knob present in *S. sacer* (Fig. 30 cf. Fig. 38). The female of *S. sacer* is diagnosed by the epigynum, which has a short tongue-like process standing more or less erect from the anterior margin; this character groups *S. sacer* with *S. sacratus* and *S. pallidus*. The females of *S. sacer* and *S. sacratus* may be distinguishable by the greater length of the tongue in *S. sacer* (Fig. 31 cf. Fig. 43), but more specimens of *S. sacratus* are required for confirmation of this difference. The females of *S. sacer* and of *S. sacratus* are separable from *S. pallidus* by their somewhat larger size, and by the presence in *S. pallidus* of clear epigastric striae; the epigyna of these three species are very similar in form (Figs. 27, 36, 41), but that of *S. pallidus* is smaller in size and less strongly marked.

Distribution.—*S. sacer* has been recorded from Alaska, Yukon Territory, British Columbia, Mackenzie, Alberta, Wyoming and Oregon; it is also known from west Greenland (Holm 1967) (Map 1).

Natural History.—Males have been taken in April, June and August, females in April, June, August and September; the chief maturity period is probably in late spring and summer. Holm (1967) records that the species was mostly caught (in west Greenland) in pitfall traps and by sifting leaf litter in herbaceous areas, heathland and bog.

Scotinotylus pallidus (Emerton), new combination

Figures 32, 33, 34, 35, 36, 37; Map 3

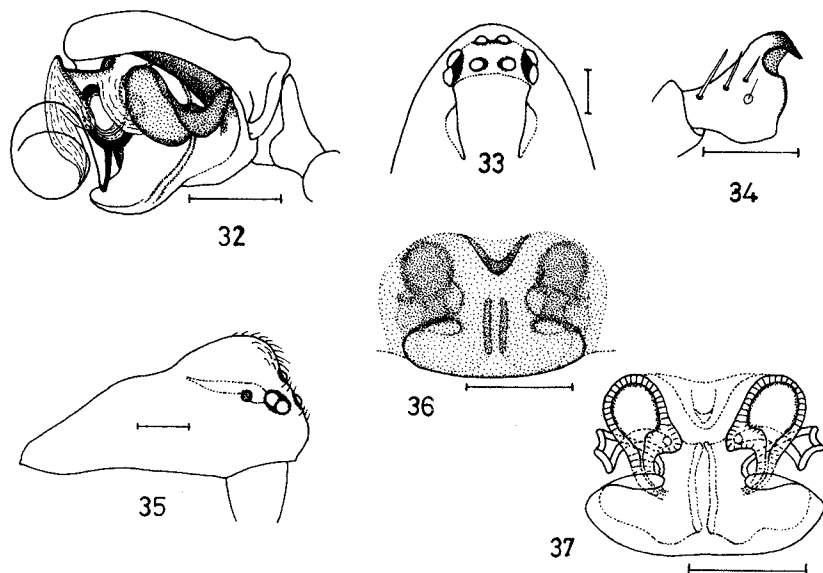
Lophocarenum pallidum Emerton 1882:480; 1909:176

Cochlembolus pallidus: Crosby and Bishop 1933:168; Roewer 1942:660; Bonnet 1956:1175

Erigone pallens Marx 1890:535 (not *Erigone pallens* Cambridge 1872)

Type.—The type locality was reported to be White Mountains, New Hampshire, and the date of capture June 1878. The type material in MCZ is labelled “from glen and base of Mt. Washington, June 1877”; this vial contains one female of *S. pallidus*, one male of an unidentified species and females of two unidentified species. A second vial of ? type material from Mt. Washington, N.H., June 1877, contains one male of *S. pallidus*, and a male and female of another species. At that period, type material was frequently regarded as of little importance, and this mixture of species in the type vials is not particularly surprising.

Description.—Total length: female 1.1-1.7 mm, male 1.1-1.65 mm. Carapace: length: female 0.62-0.70 mm, male 0.65-0.70 mm. Pale brown to orange-brown, with dusky or black markings and margins. The male carapace is raised into a rather shallow lobe and the clypeus projects (Figs. 33, 35). Abdomen: pale grey to black; the epigastric plates are striated, with the striae fairly closely spaced in the female, and fairly widely spaced in the male. Sternum: yellow with dusky margins in the paler specimens, but almost black in the



Figs. 32-37.—*S. pallidus*: 32, male palp, mesal; 33, male carapace, dorsal; 34, male palpal tibia, ectal; 35, male carapace, lateral; 36, epigynum; 37, internal genitalia, female, ventral (Scale lines 0.1 mm).

darker specimens. Legs: pale orange-brown to brown. Tibial spines: female 2221, male 0021 or 1121, but very weak. TmI: female/male 0.37-0.40. Male palp: Figs. 32, 34; the tibia bears 2-3 stout spines. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 36; internal genitalia Fig. 37. The specimens of this species from the north-eastern United States, Ontario and Quebec are small and pale in color, but specimens presumably of this species (having identical palps and epigyna) from further west and south are larger and usually much darker in color.

Diagnosis.—*S. pallidus* is closely related to *S. sacer*, and its diagnosis is dealt with under that species.

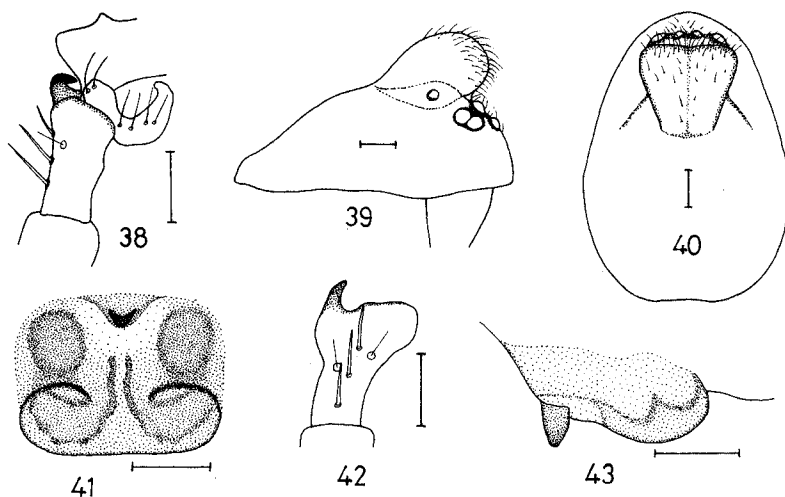
Distribution.—*S. pallidus* has a wide distribution, having been recorded from Ontario, Manitoba, Quebec, New Brunswick, Saskatchewan, Alberta, New York, New Hampshire, Massachusetts, Connecticut, Michigan, Montana, Utah, S. Dakota, Colorado, Wyoming and New Mexico (Map 3).

Natural History.—Males have been taken in March-October, females in practically every month of the year. In Canada it has been taken in pitfall traps in woods and in a bog; there is no information on habitats in U.S.A.

Scotinotylus sacratus, new species
Figures 38, 39, 40, 41, 42, 43; Map 3

Type.—Male holotype from Mirror Lake, Uintah Mts., Utah, July 28, 1936 (W. Ivie); deposited in AMNH.

Description.—The two sexes were taken together. Total length: female 1.75-1.85 mm, male 1.65-1.75 mm. Carapace: length: female/male 0.80 mm. Orange-brown, with dusky markings and margins. Male carapace with large lobe, which is rather triangular in outline when viewed dorsally (Figs. 39, 40). Abdomen: grey to black; epigastric plates smooth or with very weak striae. Sternum: orange-brown, suffused with black. Legs: orange-brown. Tibial spines: female/male 2221, but thin and weak in the male. TmI: female/male



Figs. 38-43.—*S. sacratus*: 38, male palpal tibia, ectal; 39, male carapace, lateral; 40, male carapace, dorsal; 41, epigynum; 42, male palpal tibia, dorsal; 43, epigynum, lateral (Scale lines 0.1 mm).

0.37-0.40. Male palp: the palpal organs are practically identical with those of *S. sacer*. The tibia has 3 stout spines; the tibial apophysis (Figs. 38, 42) lacks the ecto-dorsal knob present in *S. sacer*. Female palp: tibia with 2 trichobothria. Epigynum: Figs. 41, 43.

Diagnosis.—*S. sacratus* is closely related to *S. sacer*, and its diagnosis is dealt with under that species.

Distribution.—This species is known only from Utah and Colorado (Map 3).

Natural History.—Males have been taken in July, females in July and August. One female was caught in spruce, fir forest at 3535 m in Colorado.

Scotinotylus alienus (Kulczynski), new combination

Figure 47; Map 1

Erigone (*Ceratinopsis*?) *aliena* Kulczynski 1885:40 (male)

Caledonia aliena: Hull 1911:49; Roewer 1942:659

Caledonia evansi: Holm 1960:111 (probably)

Ceratinopsis aliena: Bonnet 1956:1017

Type.—Male type from Kamchatka, eastern Siberia. This is probably in Instytut Zoologiczny at Warsaw, Poland, but I have not been able to borrow it for examination.

I have followed Holm (1960) in accepting that *S. alienus* is probably not identical with *S. evansi* (Cambridge). If this assumption is correct, the species found in western North America is most likely to be *S. alienus*, which was described from material taken in an adjacent area in eastern Asia. An analogous case is the presence of *Walckenaeria* (*Cornicularia*) *lepida* (Kulczynski) in both Kamchatka and western North America (recorded as its synonym *Cornicularia pacifica* Emerton: Ivie 1965). I have assumed therefore that the females taken in north-western America are *S. alienus*, but capture of the male is necessary to confirm (or refute) this view.

Description.—Total length: female 2.35 mm. Carapace: length: female 0.90-1.0 mm. Chestnut-brown with dusky markings and margins. Abdomen: grey; epigastric plates smooth. Sternum: brown, heavily suffused with black. Legs: brown to orange-brown. Tibial spines: female 2221. Tml: female 0.48-0.50. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 47; the internal genitalia are probably almost identical with those of *S. evansi* (Fig. 48). According to Kulczynski's description and figures (1885), the male of *S. alienus* is generally similar to *S. evansi*, but there is a difference in the position of the pointed apophysis which projects from the first turn of the embolic coil.

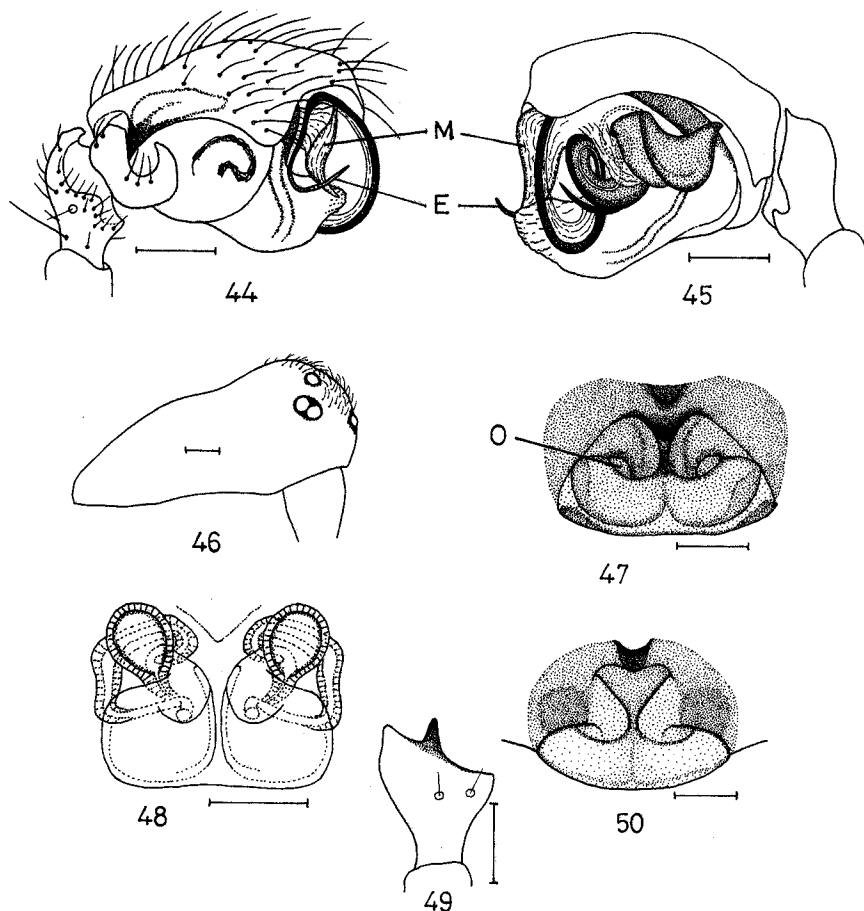
Diagnosis.—Kulczynski's description shows that the male of *S. alienus* is very similar to *S. evansi*, with the carapace of the same form (Fig. 46). The male will therefore fall into Section 2 of the Key, with *S. protervus*, from which it will readily be separated by the form of the carapace (Fig. 46 cf. Fig. 71). The female of *S. alienus* is diagnosed by the form of the epigynum, which has a dark colored cusp or small knob on the anterior margin, a character which groups it with *S. eutypus*, *S. alpinus* and *S. protervus*. From these three species, *S. alienus* is distinguished without difficulty by the form of the epigynum (Fig. 47 cf. Figs. 20, 55, 72). The epigynum of *S. alienus* seems to be indistinguishable from that of the European species *S. evansi*.

Distribution.—This species is known in North America from Alaska (*Caledonia evansi*: Holm 1960), Alberta and Yukon Territory (Map 1).

Natural History.—The females were taken in June and August. Nothing is recorded on habitat.

Scotinotylus alpinus (Banks), new combination

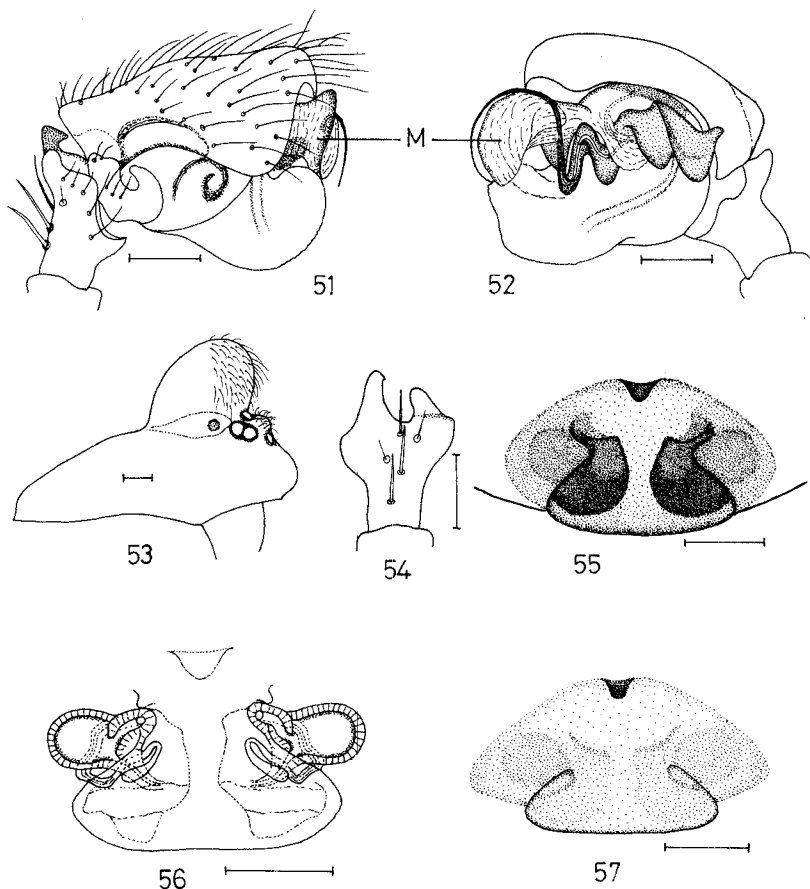
Figures 3, 51, 52, 53, 54, 55, 56, 57; Map 2

Dismodicus alpinus Banks 1896:63*Gongylidium lapidicola* Soerensen 1898:204 (female, not male)*Gonatium inflatum* Soerensen 1898:206 (male)*Lophocarenum alpinum*: Emerton 1909:190*Tortembolus alpinus*: Crosby 1925:115*Cochlembolus alpinus*: Crosby 1929:79; Roewer 1942:660; Bonnet 1956:1175; Holm 1967:12*Scotinotylus ungavensis* Jackson 1933:150*Coryphaeolana lapidicola*: Braendegaard 1937:10 (female, not male); 1946:45.*Scotinotylus lapidicola*: Holm 1958:526not *Lophocarenum alpinum* (male): Emerton 1915:150**Type.**—Type from Mount Washington, New Hampshire; in MCZ, examined.

Figs. 44-50.—44, *S. evansi*, male palp, ectal; 45, *S. evansi*, male palp, mesal; 46, *S. evansi*, male carapace, lateral; 47, *S. alienus*, epigynum; 48, *S. evansi*, internal genitalia; female, ventral; 49, *S. evansi*, male palpal tibia, dorsal; 50, *S. alpigena*, epigynum. Abbreviations: E, embolus; M, membranous part of suprategular apophysis; O, opening of spermathecal duct. (Scale lines 0.1 mm).

Description.—Total length: female 2.0-2.65 mm, male 1.8-2.05 mm. Carapace: length: female 0.90-1.10 mm, male 0.90-1.0 mm. Orange-brown to chestnut-brown, with dusky markings. Male carapace with a large lobe and projecting clypeus (Fig. 53). Abdomen: grey to black; epigastric plates smooth. Sternum: orange-brown, suffused with black. Legs: brown to orange-brown. Tibial spines: female/male 22/21, but very weak in male on legs I and II. TmI: female 0.45-0.50, male 0.43-0.50. Male palp: Figs. 51, 52, 54; the embolus is fairly short and stout distally, and the tibia has 3 stout spines. Female palp: tibia with 2 trichobothria. Epigynum: Figs. 55, 57; the degree of pigmentation is variable, but the very dark form seems to be the commonest. Internal genitalia: Fig. 56.

Diagnosis.—The male of *S. alpinus* is grouped with *S. sacer*, *S. sacratus* and *S. pallidus* by the single carapace lobe and the presence on the palpal tibia of 2-3 stout spines; its separation from these three species is dealt with under *S. sacer* diagnosis. The female of *S. alpinus* is diagnosed by the epigynum, which has a cusp-shaped knob on the anterior margin, a character which groups the species with *S. eutypus*, *S. alienus* and *S. protervus*. From these three species, *S. alpinus* is distinguished without difficulty by the form of the epigynum (Figs. 55, 57 cf. Figs. 20, 47, 72); it must be borne in mind that the depth of pigmentation of the epigynum varies considerably.



Figs. 51-57.—*S. alpinus*: 51, male palp, ectal; 52, male palp, mesal; 53, male carapace, lateral; 54, male palpal tibia, dorsal; 55, epigynum; 56, internal genitalia, female, ventral; 57, epigynum, pale specimen. Abbreviation: M, membranous part of suprategular apophysis. (Scale lines 0.1 mm).

Distribution.—This species has a wide distribution in the northern parts of the continent. It has been recorded from Alaska, Yukon Territory, British Columbia, Alberta, Manitoba, Quebec, Baffin Island and New Hampshire, but also from high altitudes in Wyoming and Colorado (Map 2). It is also known from Greenland (Holm 1967).

Natural History.—Males and females have been taken from June to September; the maturity period is in summer. Holm (1967) states that the species is found almost exclusively under stones.

Scotinotylus patellatus (Emerton), new combination

Figures 58, 59, 60, 61, 62, 63, 64; Map 3

Araeonus patellatus Emerton 1917:262; Roewer 1942:685 (the locality quoted should be "British Columbia," not "Columbia"); Bonnet 1955:378

Type.—Male holotype from Metlakatla, British Columbia (J. H. Keen): in MCZ, examined. Since 1903, this locality has been in Alaska.

Description.—Total length: female 1.65-1.90, male 1.7 mm. Carapace: length: female 0.8-0.9 mm, male 0.85-0.90 mm. Orange-brown, with dusky markings. Male carapace not raised into lobe (Fig. 60); numerous long backward-directed bristles arise from the ocular region. Abdomen: grey to black; epigastric plates smooth. Sternum: orange, suffused with black. Legs: orange-brown. Tibial spines: female 2221, male 0021. The curved hairs on tibiae I and metatarsi I of the male are strongly developed. TmI: female 0.46-0.53, male 0.48. Male palp: Figs. 58, 59, 64; the tibia bears 2-3 stout spines, and the femur is somewhat swollen. Female palp: tibia with 2 trichobothria. Epigynum: Figs. 61, 63; the tongue is always long, but the width shows small variations. Internal genitalia: Fig. 62.

Diagnosis.—The male of *S. patellatus* is diagnosed by the absence of a raised lobe on the carapace, a character which groups it with *S. protervus* and *S. alienus*. From these two species it is distinguished by the presence of 3 fairly stout spines on the palpal tibia (Fig. 58), by the form of the carapace (Fig. 60 cf. Figs. 46, 71) and by the form of the embolus. The embolus is simple in *S. patellatus* (Figs. 58, 59) but has a terminal loop in *S. protervus* (Figs. 67, 68), while in *S. alienus* there is a pointed apophysis arising from the first turn of the embolic coil similar to that in *S. evansi* (Fig. 45). The female epigynum of *S. patellatus* has a very distinctive club-shaped "tongue" arising from the anterior margin (Figs. 61, 63), which permits immediate diagnosis of the species. *S. gracilis* has a somewhat similar epigynal process, which is however longer and much more slender (Fig. 65).

Distribution.—This species appears to be widespread along the western coastal area; it has been recorded from Alaska, British Columbia, Washington, Oregon and California (Map 3).

Natural History.—The male has been taken in January-February, the female in March, May, July, August, October and December. Nothing is recorded on habitat.

Scotinotylus gracilis, new species

Figures 65, 66; Map 3

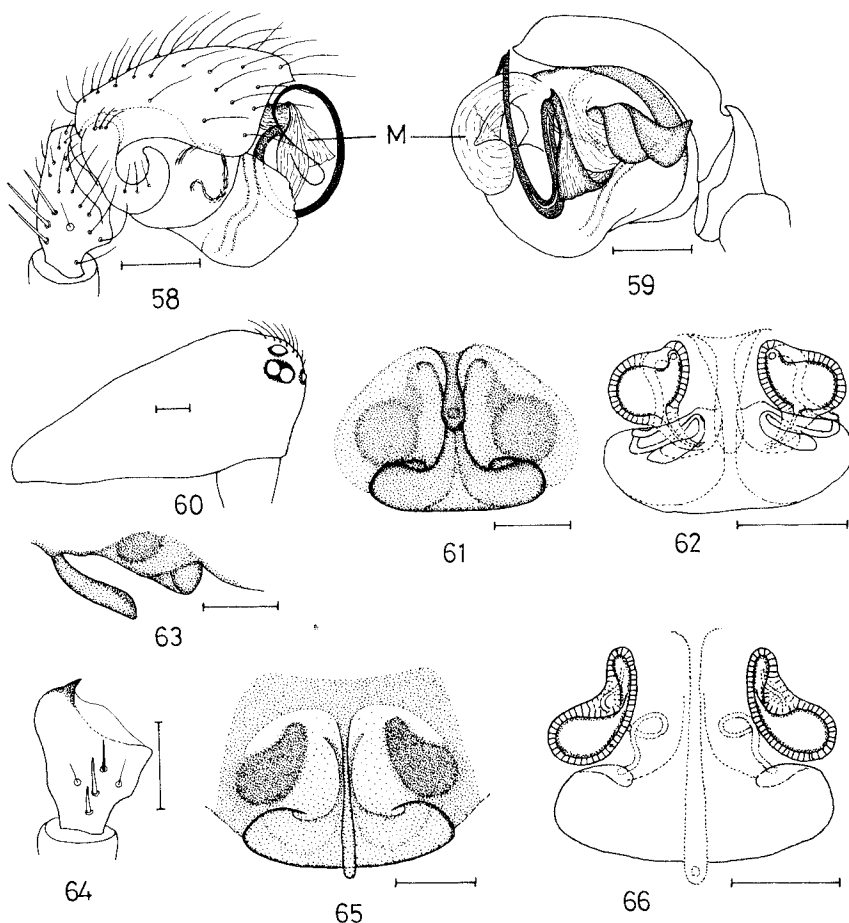
Type.—Female holotype from west of Inverness, Marin Co., California, November 8, 1953 (V. Roth and G. Marsh); deposited in AMNH.

Description.—Only the female is known. Total length: female 1.9 mm. Carapace: length: female 0.80 mm. Orange-brown, with black markings and margins. Abdomen: black; epigastric plates smooth. Sternum: black. Legs: orange-brown. Tibial spines: female 2221. TmI: female 0.47. Female palp: tibia with 2 trichobothria. *Epigynum*: Fig. 65; there is a long, thin, semi-transparent tongue arising from the anterior margin. *Internal genitalia*: Fig. 66.

Diagnosis.—The species is diagnosed by the form of the epigynum, which has a long slender process arising from the anterior margin (Fig. 65); this process is longer, narrower and more transparent than the corresponding process in *S. patellatus* (Fig. 61).

Distribution.—Known only from the type locality (Map 3).

Natural History.—The female was taken in November, but nothing was recorded on habitat.



Figs. 58-66.—58, *S. patellatus*, male palp, ectal; 59, *S. patellatus*, male palp, mesal; 60, *S. patellatus*, male carapace, lateral; 61, *S. patellatus*, epigynum, ventral; 62, *S. patellatus*, internal genitalia, female, ventral; 63, *S. patellatus*, epigynum, lateral; 64, *S. patellatus*, male palpal tibia, dorsal; 65, *S. gracilis*, epigynum; 66, *S. gracilis*, internal genitalia, female, ventral. Abbreviation: M, membranous part of suprategular apophysis. (Scale lines 0.1 mm).

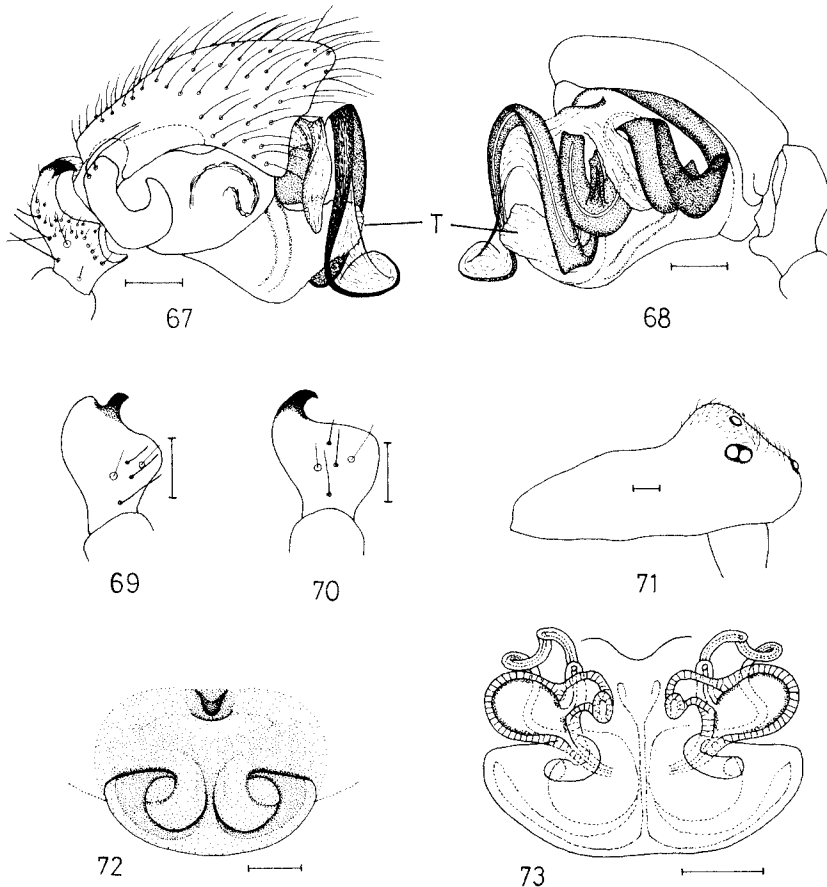
Scotinotylus protervus (L. Koch), new combination

Figures 5, 67, 68, 69, 70, 71, 72, 73; Map 1

Erigone proterva L. Koch 1879:70; Bonnet 1956:1772*Caledonia proterva*: Holm 1960:112; 1970:190

Type.—Female holotype from Tunguska, west Siberia; in Naturhistoriska Riksmuseum, Stockholm. The female has such a characteristic epigynum (Holm 1960) that examination of the type was considered to be unnecessary.

Description.—The only previous description of the male (Holm 1970) was based on a specimen which had not completed its final moult. Total length: female 2.5-2.9 mm, male 2.7 mm. Carapace: length: female 1.1-1.25 mm, male 1.2 mm. Brown to chestnut-brown. The male carapace is raised anteriorly, the elevation bearing numerous bristles (Fig. 71); the clypeus projects strongly. Abdomen: grey to black; the epigastric plates are smooth. Sternum: orange-brown, suffused with black. Legs: brown to orange-brown. Tibial spines: female/male 2221, but short and weak in the male. TmI: female 0.65-0.70, male 0.67.



Figs. 67-73.—*S. protervus*: 67, male palp, ectal; 68, male palp, mesal; 69, male palpal tibia, dorsal; 70, male palpal tibia, ecto-dorsal; 71, male carapace, lateral; 72, epigynum; 73, internal genitalia, female, ventral. Abbreviation: T, tegulum. (Scale lines 0.1 mm).

Male palp: Figs. 67, 68, 69, 70; the embolus ends in a small loop. There are no stout spines on the palpal tibia. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 72; the internal ducts follow a rather sinuous course (Fig. 73).

Diagnosis.—*S. protervus* male is diagnosed by the distinctive form of the carapace (Fig. 71), by the absence of stout spines on the palpal tibia, and by the form of the embolus, which terminates in a small loop (Figs. 67, 68). The female is diagnosed by the epigynum, which has a small cusp-shaped knob on the anterior margin, in common with *S. eutypus*, *S. alpinus* and *S. alienus*; from these three species it is readily separated by the distinctive form of the epigynum, which has large, clear cavities on either side of the median septum (Fig. 72, cf. Figs. 20, 47, 55).

Distribution.—In North America this species is known only from Alaska and Yukon Territory (Map 1); Holm's records (Holm 1960, 1970) are included on this map.

Natural History.—Adult males have been taken in August; Holm (1970) recorded a male near its final moult in July. The female has been taken in June, July and August. In Alaska, both sexes were taken together under rocks on tundra at 1200 m.

Scotinotylus vernalis (Emerton), new combination

Figures 6, 74, 75, 76, 77, 78, 79; Map 2

Lophocarenum vernalis Emerton 1882:51

Erigone vernalis: Marx 1889:536

Diplocephalus vernalis: Banks 1910:27

Cochlembolus vernalis: Crosby 1929:82; Roewer 1942:660; Bonnet 1956:1175

Scylaceus divisus Chamberlin 1948:544 **NEW SYNONYMY.** The type female (AMNH) has been examined and found to be identical with *S. vernalis*.

Type.—Male and female types from Pine Rock, New Haven, Connecticut, in March; in MCZ, examined.

Description.—Total length: female 1.8-1.85 mm, male 1.75-1.9 mm. Carapace: length: female 0.75 mm, male 0.85-0.9 mm. Orange-brown, with faint dusky markings. Male carapace raised into a small lobe (Fig. 76). Abdomen: grey. Epigastric plates with weak striae in male; striae absent or extremely weak in female. Sternum: orange, suffused with black. Legs: orange. Tibial spines: female 2221, male 0211. TmI: female 0.41-0.46, male 0.42. Male palp: Figs. 74, 75, 78; there are no stout spines on the tibia. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 77; brown, suffused with black. There is a broad tongue-shaped process arising from the anterior area. Internal genitalia: Fig. 79.

Diagnosis.—The male of *S. vernalis* is diagnosed by the presence of a single lobe on the carapace, and by the absence of stout spines on the palpal tibia; these characters place it with *S. regalis* and *S. pollucis*. From these two species *S. vernalis* is distinguished by its shallower lobe (Fig. 76 cf. Figs. 89, 99) and by the form of the palpal tibia, which has two small pointed apophyses (Figs. 75, 78 cf. Figs. 84, 101). The female of *S. vernalis* is diagnosed by the epigynum, which has a broad tongue-like process (Fig. 77); the only species with which it could be confused is *S. exsectoides*, which has a relatively smaller tongue and is paler in color (Fig. 77, cf. Fig. 80).

Distribution.—This species is known from Ontario, Michigan, Massachusetts, Connecticut, Nebraska and N. Dakota (Map 2)

Natural History.—Most of the records are for males, females having been taken on very few occasions; the reason for this is not known. Males have been taken in January, April, May-June, October, November and December, females only in April. Nothing is recorded on habitat.

Scotinotylus exsectoides, new species

Figures 80, 81; Map 2

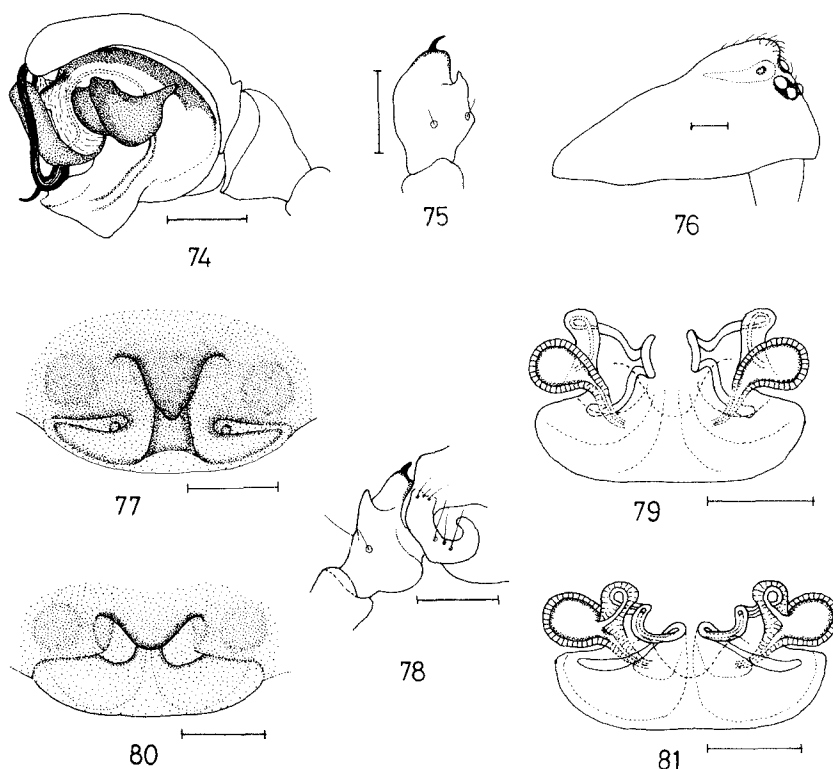
Type.—Female holotype from Actinolite, Ontario, April 25, 1966 (G. Ayre); deposited in CNC, Ottawa.

Description.—Only the female is known. Total length: female 2.0-2.4 mm. Carapace: length: female 0.90-0.95 mm. Orange-brown with faint dusky markings. Abdomen: grey; striae on epigastric plates very weak or absent. Sternum: orange, with dusky margins. Legs: orange to orange-brown. Tibial spines: female 2221. TmI: female 0.51-0.54. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 80; pale orange or yellow in color. There is a broad tongue-shaped process arising from the anterior area. Internal genitalia: Fig. 81.

Diagnosis.—The female of this species is diagnosed by the epigynum (Fig. 80), which like that of *S. vernalis* (Fig. 77) has a broad tongue-like process. The tongue in *S. exsectoides* is relatively shorter, the epigynum is paler in color, and there are differences in the structural detail.

Distribution.—Known only from the type locality (Map 2).

Natural History.—Numerous females were taken in April at the type locality, in the brood nest of the ant *Formica exsectoides* Forel.



Figs. 74-81.—74, *S. vernalis*, male palp, meso-ventral; 75, *S. vernalis*, male palpal tibia, dorsal; 76, *S. vernalis*, male carapace, lateral; 77, *S. vernalis*, epigynum; 78, *S. vernalis*, male palpal tibia, ectal; 79, *S. vernalis*, internal genitalia, female, ventral; 80, *S. exsectoides*, epigynum; 81, *S. exsectoides*, internal genitalia, female, ventral. (Scale lines 0.1 mm).

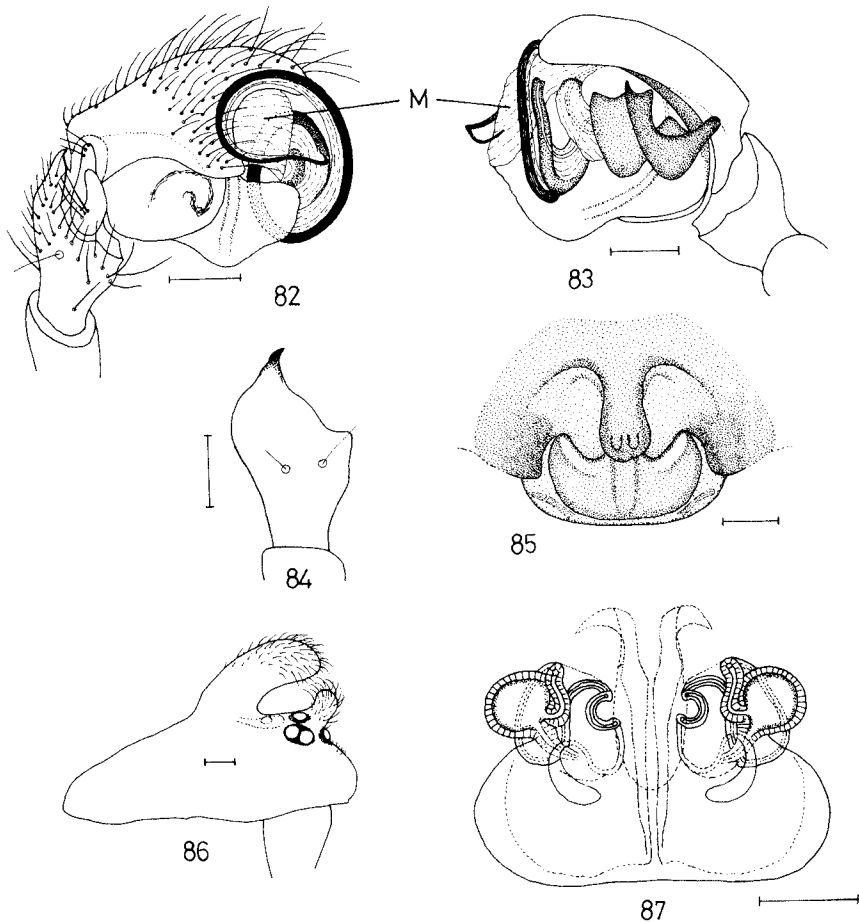
Scotinotylus majesticus (Chamberlin and Ivie), new combination

Figures 4, 14, 82, 83, 84, 85, 86, 87; Map 3

Yukon majesticum Chamberlin and Ivie 1947:52

Type.—Male holotype from Matanuska Valley, Alaska, August 23-31, 1943 (J. C. Chamberlin); in AMNH. Paratypes (AMNH) examined.

Description.—Total length: female 2.55-2.75 mm, male 2.30-2.35 mm. Carapace: length: female 1.10-1.15 mm, male 1.05-1.10 mm. Orange-brown, with dusky markings and margins. Male carapace with 2 lobes, one large, one small (Fig. 86); the size and shape of the lobes shows small variations. Abdomen: grey to black; striae on epigastric plates very weak or absent in female, weak and closely spaced in male. Sternum: orange-brown, heavily suffused with black. Legs: orange-brown. Tibial spines: female 2221, male 0221 but short and weak. TmI: female/male 0.57-0.60. Male palp: Figs. 82, 83, 84; there are no stout spines on the tibia. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 85; the length and width of the stout tongue-shaped process shows some variation. The internal ducts follow a very sinuous course (Fig. 87).



Figs. 82-87.—*S. majesticus*: 82, male palp, ectal; 83, male palp, mesal; 84, male palpal tibia, dorsal; 85, epigynum; 86, male carapace, lateral; 87, internal genitalia, female, ventral. Abbreviation: M, membranous part of suprategular apophysis. (Scale lines 0.1 mm).

Diagnosis.—The male of *S. majesticus* is diagnosed by the form of the carapace (Fig. 86), which at once separates it from all the other species in the genus; confirmation is afforded by the palp (Figs. 82, 83) and palpal tibia (Fig. 84). The female is diagnosed by the epigynum, which has a long broad process arising from the anterior margin (Fig. 85); this character separates *S. majesticus* from all other species in the genus except *S. magnificus* and *S. regalis*. The females of *S. majesticus* and *S. magnificus* appear to be indistinguishable by the epigynum or any other character. The epigynum of *S. regalis* is very similar to that of *S. majesticus*, but the two species are distinguishable by the form of the posterior wing-like markings (Fig. 85 cf. Fig. 91).

Distribution.—This species is known from Alaska, Yukon Territory, Colorado and Wyoming (Map 3). Females taken without males in Colorado may be either *S. majesticus* or *S. magnificus* and are not recorded on Map 3.

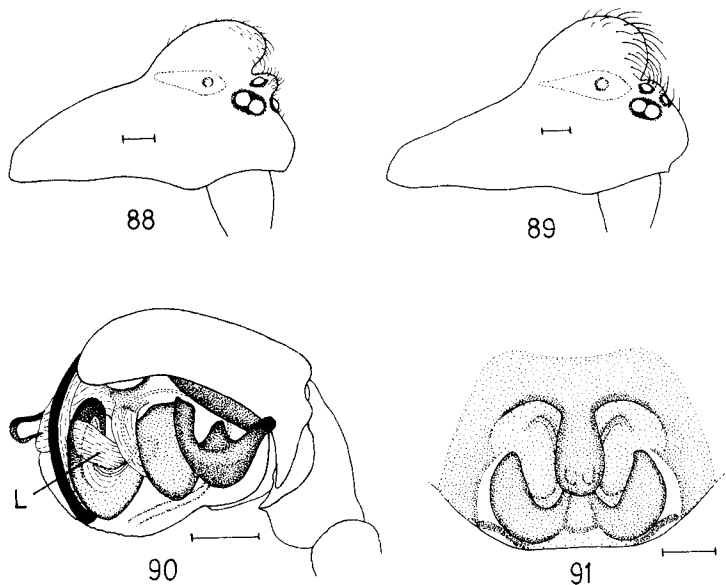
Natural History.—Males have been taken in July and August, females in July, August, September and October. In Colorado and Wyoming it is found only at high altitudes (3-4000 m). Nothing is recorded on habitat.

Scotinotylus magnificus, new species

Figure 88; Map 3

Type.—Male holotype from Independence Pass, 3700 m, Sawatch Mts., Lake Co., Colorado, July 21, 1961 (H. and L. Levi); deposited in MCZ.

Description.—The male and female were taken together. Total length: female 2.3-2.55 mm, male 2.0 mm. Carapace: length: female 1.0-1.1 mm male 0.95 mm. Orange-brown, with blackish markings and margins. Male carapace raised into a large lobe, with a tiny additional lobe anterior to it (Fig. 88); no intermediates between this carapace form and that of *S. majesticus* have been seen. Abdomen: grey to black; striae on epigastric plates



Figs. 88-91.—88, *S. magnificus*, male carapace, lateral; 89, *S. regalis*, male carapace, lateral; 90, *S. regalis*, male palp, mesal; 91, *S. regalis*, epigynum. Abbreviation: L, lamellar apophysis from embolus. (Scale lines 0.1 mm).

very weak or absent in female, weak and closely spaced in male. Sternum: orange-brown, heavily suffused with black. Legs: brown to orange-brown. Tibial spines: female/male 2221, but very short in male and sometimes absent on tibiae I and II. TmI: female 0.52-0.55, male 0.54-0.57. Male palp: identical with that of *S. majesticus*. Female palp: tibia with 2 trichobothria. Epigynum: not distinguishable from that of *S. majesticus*.

Diagnosis.—*S. magnificus* male is diagnosed by the form of the carapace, which has one large and one tiny lobe (Fig. 88); confirmation is given by the palp, which is devoid of stout spines and is not distinguishable from that of *S. majesticus*. The females of *S. magnificus* and *S. majesticus* appear to be structurally indistinguishable.

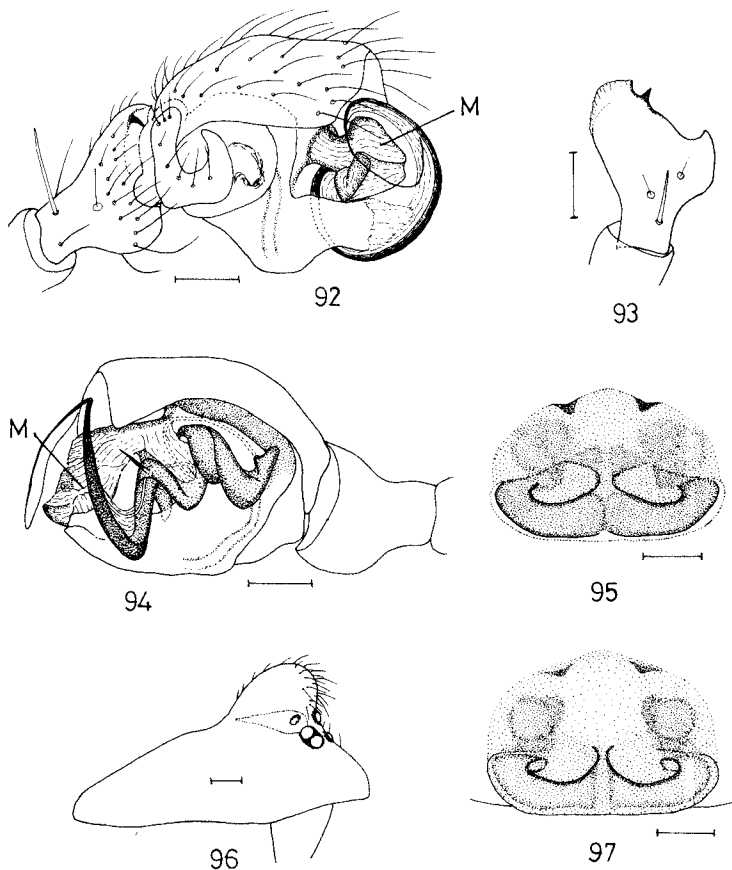
Distribution.—This species is known only from Colorado (Map 3).

Natural History.—Both sexes were taken in July, at a high altitude (3700 m) in Colorado; nothing was recorded on habitat.

Scotinotylus regalis, new species

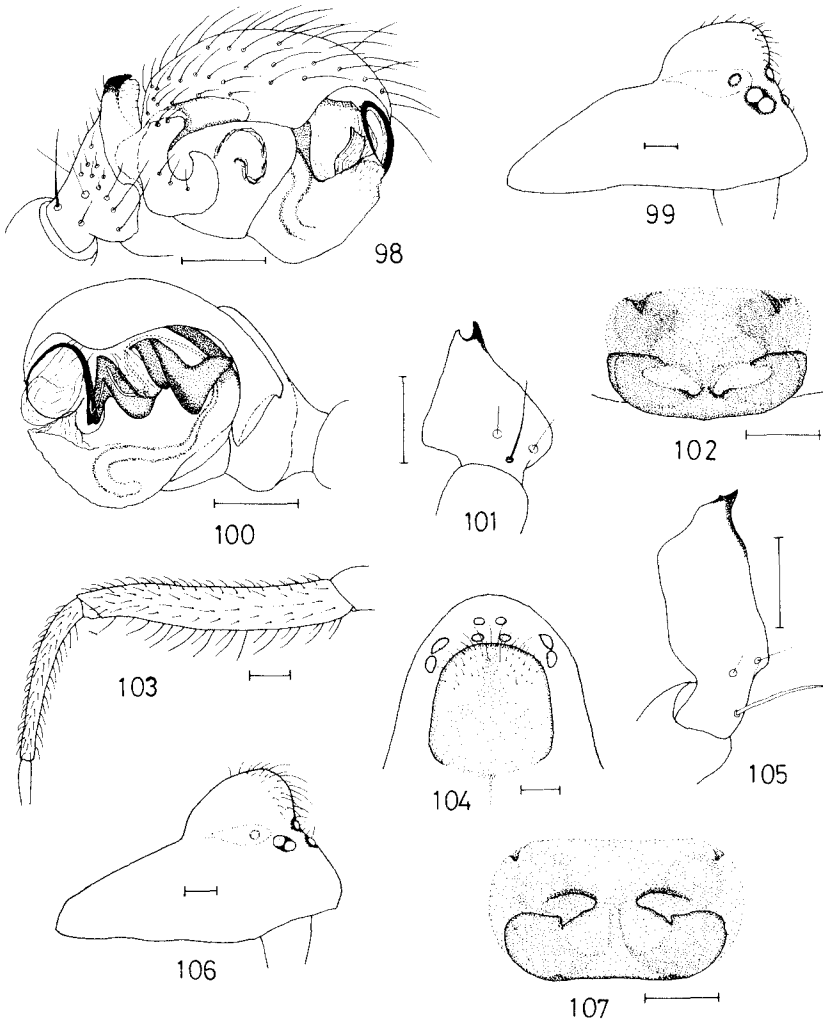
Figures 89, 90, 91; Map 3

Type.—Male holotype from Last Chance Gulch, Helena, Jefferson Co., Montana, October 3, 1964 (J. and W. Ivie); deposited in AMNH.



Figs. 92-97.—*S. kenus*: 92, male palp, ectal; 93, male palpal tibia, dorsal; 94, male palp, mesal; 95, epigynum; 96, male carapace, lateral; 97, epigynum, a paler specimen. Abbreviation: M, membranous part of suprategular apophysis. (Scale lines 0.1 mm).

Description.—The male and female were taken together. Total length: female 2.30-2.60 mm, male 2.0-2.1 mm. Carapace: length: female 1.0-1.2 mm, male 1.0 mm. Orange-brown, with dusky markings and margins. Male carapace raised into a single lobe, which bears long, forward-directed bristles anteriorly (Fig. 89). Abdomen: grey to black; striae on epigastric plates very weak in female, weak and closely spaced in male. Sternum: orange, heavily suffused with black. Legs: orange to orange-brown. Tibial spines: female/male 2221, but very short in male and sometimes absent on tibiae I and II. TmI: female/male 0.50-0.53. Male palp: Fig. 90; arising from near the base of the embolic coil there is a lamellar apophysis (L, Fig. 90), but apart from this, the palp is closely similar to that of *S. majesticus*/*S. magnificus*. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 91; the length of the tongue shows small variation.



Figs. 98-107.—98, *S. pollucis*, male palp, ectal; 99, *S. pollucis*, male carapace, lateral; 100, *S. pollucis*, male palp, mesal; 101, *S. pollucis*, male palpal tibia, dorsal; 102, *S. pollucis*, epigynum; 103, *S. pollucis*, tibia and metatarsus of leg I, male; 104, *S. crinitus*, male carapace, dorsal; 105, *S. crinitus*, male palpal tibia, dorsal; 106, *S. crinitus*, male carapace, lateral; 107, *S. crinitus*, epigynum. (Scale lines 0.1 mm).

Diagnosis.—The male of *S. regalis* is diagnosed by the single large lobe on the carapace and by the absence of stout spines on the palpal tibia; these characters place it with *S. pollucis* in the Key. From this latter species, *S. regalis* is separated by its much wider embolic coil (Fig. 90 cf. Fig. 100), and by the form of the palpal tibia (Fig. 84 cf. Fig. 101). The palp of *S. regalis* is very similar to those of *S. majesticus* and *S. magnificus*, but is distinguished by the presence of the lamellar apophysis near the base of the embolus (L, Fig. 90). The female of *S. regalis* has the epigynum very similar to that of *S. majesticus*/*S. magnificus*, but *S. regalis* is distinguishable by the form of the posterior wing-like markings (Fig. 91 cf. Fig. 85).

Distribution.—This species is known only from the type locality (Map 3).

Natural History.—Both sexes were taken in some number in October; nothing was recorded on habitat.

Scotinotylus ambiguus, new species

Figures 121, 133; Map 3

Type.—Female holotype from Cedar Lake, N. Leadpoint, Washington, May 1962 (W. Ivie); deposited in AMNH.

Description.—Only the female is known. Total length: female 1.8-2.2 mm. Carapace: length: female 0.85-0.95 mm. Orange-brown. Abdomen: grey to black; epigastric plates with fairly clear striae. Sternum: orange, suffused with black. Legs: orange to brown. Tibial spines: female 2221. TmI: female 0.37-0.43. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 121; internal genitalia Fig. 133.

Diagnosis.—This species is diagnosed by the epigynum; the absence of a linguiform process and of cusps places it with *S. monoceros* in the Key. *S. ambiguus* is readily separable from *S. monoceros* by the form of the epigynum (Fig. 121 cf. Fig. 151).

Distribution.—This species is recorded from British Columbia, Washington, Idaho and Wyoming (Map 3).

Natural History.—Females were taken in March, May (numerous), June and July; nothing was recorded on habitat.

Scotinotylus kenus (Chamberlin), new combination

Figures 10, 11, 92, 93, 94, 95, 96, 97, 134; Map 4

Cheraira kena Chamberlin 1948:519.

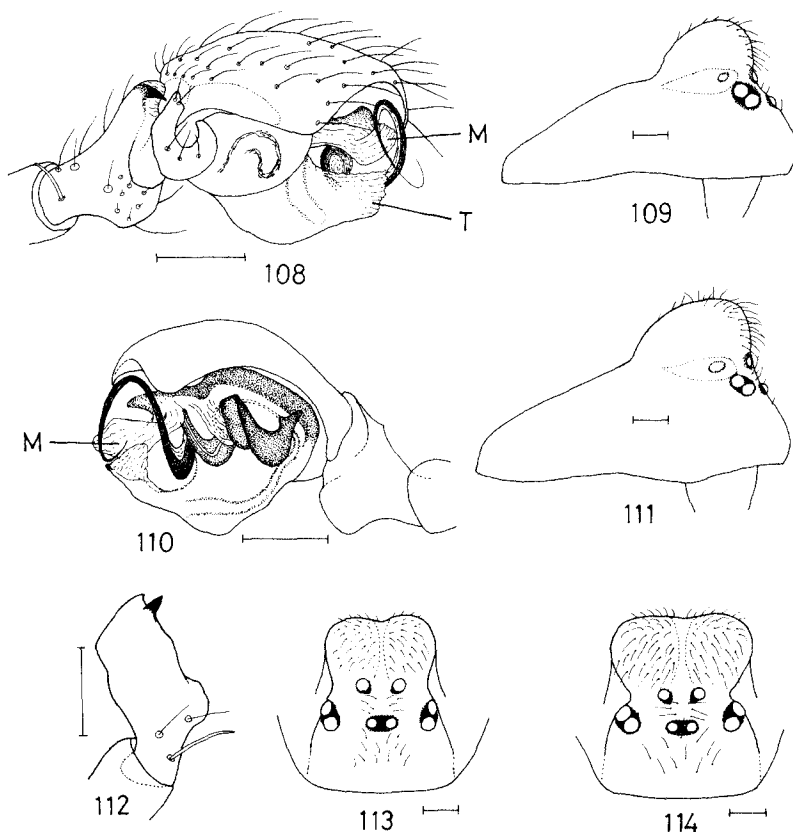
Note: it is assumed that the specific name *kena* was intended to be an adjective agreeing in gender with *Cheraira*.

Type.—No type seems to have been designated by Chamberlin, but one vial in AMNH has a label which agrees with the details given by Chamberlin (1948) under "Type locality": namely, Mirror Lake, Uintah Mts., Utah, July 28, 1936 (W. Ivie); 4 females. One of these females has been selected and labelled as "Lectotype," and is deposited in AMNH.

Description.—The male, described here for the first time, was not taken with a female, but as it came from the type locality (but on a different date) there can be little doubt as to its identity. Total length: female 2.2-2.7 mm, male 2.1 mm. Carapace: length: female/male 1.0 mm; orange-brown, with dusky markings. The male carapace is raised into a large lobe (Fig. 96), which has a shallow longitudinal furrow; the clypeus projects

strongly. Abdomen: grey; the epigastric plates have very weak, closely spaced striae in both sexes. Sternum: yellow to yellow-brown, with dusky margins. Legs: orange-brown to yellow-brown. Tibial spines: female 2221, male 1121 but weak. TmI: female 0.47, male 0.45-0.47. Male palp: Figs. 92, 93, 94; a slender black pointed apophysis arises from the first coil of the embolus. The palpal tibia bears one fairly stout spine. Female palp: tibia with 3 trichobothria, one rather small. Epigynum: Figs. 95, 97; internal genitalia Fig. 134.

Diagnosis.—The male of *S. kenus* is diagnosed by the large lobe on the carapace, by the presence of the single stout spine on the palpal tibia and by the presence of a small black tooth on the anterio-ectal margin of the palpal tibia; these characters group *S. kenus* in the Key with *S. sanctus*, *S. crinitus*, *S. humilis* and *S. montanus*, and no doubt with other related species when the males of these are discovered. *S. kenus* is distinguished from *S. humilis* by the larger carapace lobe (Fig. 96 cf. Fig. 117) and by the much larger diameter of the embolic coil (Fig. 94 cf. Fig. 115). From *S. sanctus*, *S. crinitus* and *S. montanus* males it is readily distinguished by the form of the palpal tibia (Fig. 93 cf. Figs. 105, 112, 120), and by the presence on the embolic coil of the black needle-like apophysis (Fig.



Figs. 108-114.—*S. sanctus*: 108, male palp, ectal; 109, male carapace, normal form, lateral; 110, male palp, meso-ventral; 111, male carapace, specimen from Arizona; 112, male palpal tibia, dorsal; 113, male carapace, anterior face, normal form; 114, male carapace, anterior face, specimen from Arizona. Abbreviations: M, membranous part of suprategular apophysis; T, tegulum. (Scale lines 0.1 mm).

94). The diagnosis of the female of *S. kenus* is based on the form of the epigynum, and is dealt with under *S. sanctus* diagnosis.

Distribution.—This species is known from Montana, Utah and Arizona (Map 4).

Natural History.—The male has been taken in August and October, the female in April, June and July. All the localities appear to be at moderately high altitudes, but nothing is recorded on habitat.

Scotinotylus castoris (Chamberlin), new combination

Figure 122; Map 4

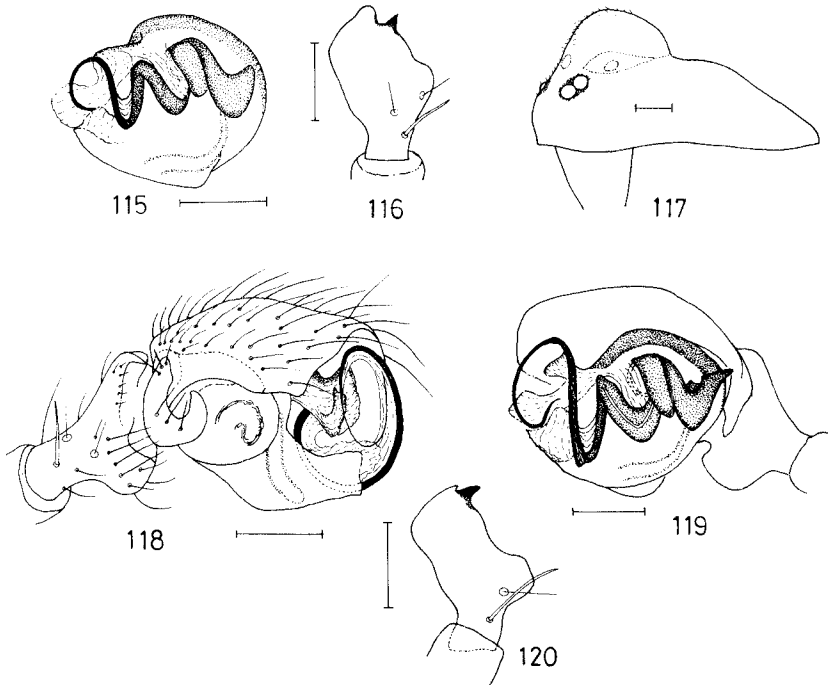
Cheraira castoris Chamberlin 1948:520

Type.—Holotype female from Beaver Canyon, 10 miles east of Beaver City, Utah, June 7, 1934 (W. Ivie and H. Rasmussen); in AMNH, examined.

Description.—Only the female is known. Total length: female 2.4-2.5 mm. Carapace: length: female 1.0-1.1 mm; orange-brown with dusky margins. Abdomen: grey-black; epigastric plates smooth. Sternum: orange, faintly reticulated with black. Legs: orange. Tibial spines: female 2221. TmI: female 0.37-0.40. Female palp: tibia with 3 trichobothria. Epigynum: Fig. 122.

Diagnosis.—*S. castoris* female is diagnosed by the epigynum; this is dealt with under *S. sanctus* diagnosis.

Distribution.—Known only from the type locality (Map 4).



Figs. 115-120.—115, *S. humilis*, male palpal organ, meso-ventral; 116, *S. humilis*, male palpal tibia, dorsal; 117, *S. humilis*, male carapace, lateral; 118, *S. montanus*, male palp, ectal; 119, *S. montanus*, male palp, meso-ventral; 120, *S. montanus*, male palpal tibia, dorsal. (Scale lines 0.1 mm).

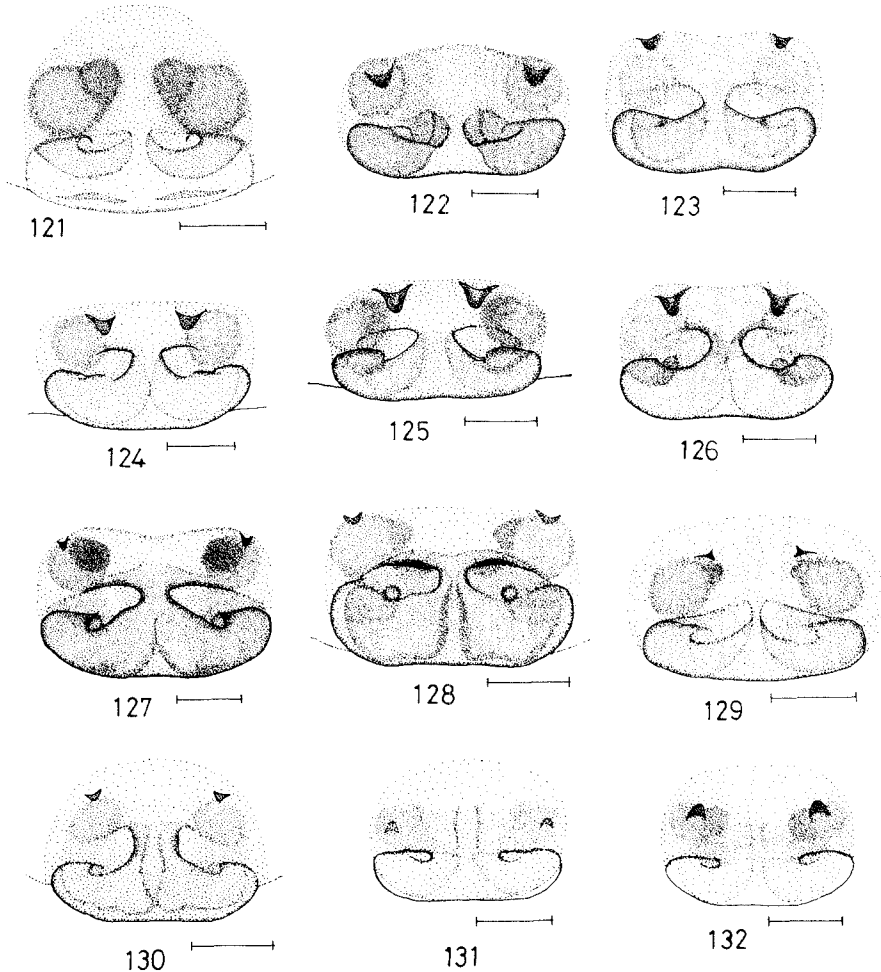
Natural History.—The two known females were taken in June; nothing was recorded on habitat.

Scotinotylus pollucis, new species

Figures 98, 99, 100, 101, 102, 103; Map 4

Type.—Holotype male from Rustlers Camp, Chiricahua Mts., Arizona, September 9, 1950 (W. J. Gertsch); deposited in AMNH.

Description.—The male and female were taken together. Total length: female 1.9 mm, male 1.85-2.05 mm. Carapace: length: female 0.85-0.90 mm, male 0.90-0.95 mm. Orange-brown, with faint dusky markings. Male carapace raised into large lobe (Fig. 99) which has a weak longitudinal furrow. Abdomen: grey to black; striae on the epigastric plates are weak or absent. Sternum: yellow-brown, with dusky reticulations and margins.



Figs. 121-132.—Epigyna. 121, *S. ambiguus*; 122, *S. castoris*; 123, *S. sanctus*; 124, *S. montanus*; 125, *S. bicavatus*; 126, *S. bipoculatus*; 127, *S. boreus*; 128, *S. sintalutus*; 129, *S. dubiosus*; 130, *S. apache*; 131, *S. bodenburgi*; 132, *S. sagittatus*. (Scale lines 0.1 mm).

Legs: orange-brown; leg I of the male has the tibia somewhat swollen, with ventral bristles, and the metatarsus is curved (Fig. 103). Tibial spines: female 2221, male 0121. TmI: female 0.40-0.44, male 0.41-0.45. Male palp: Figs. 98, 100, 101; the tibia lacks a stout spine. Female palp: tibia with 2 trichobothria, but sometimes a very small third one is also present. Epigynum: Fig. 102.

Diagnosis.—The male of *S. pollucis* has a single large lobe on the carapace and no stout spines on the palpal tibia, which places it with *S. regalis* in the Key. *S. pollucis* male is readily separated from *S. regalis* by the much smaller diameter of the embolic coil (Fig. 100 cf. Fig. 90) and by the form of the tibial apophysis (Fig. 101 cf. Fig. 84); the membranous parts of the SA are also quite different in form. The female of *S. pollucis* is diagnosed by the epigynum (Fig. 102), which is fairly readily distinguishable, by the shape of the posterior plate, from the numerous other species which have cusps on the epigynum (Section 3 of the Key).

Distribution.—This species is known from several localities in Colorado and Arizona (Map 4).

Natural History.—The male has been taken in September, the female in April, June, July, August and September. All the localities are at moderately high altitudes (2400-2800 m). Habitats recorded are in ponderosa and aspen at the side of a stream, in oak, juniper, douglas and aspen woods, and in meadow with aspen and lodgepole.

Scotinotylus sanctus (Crosby), new combination

Figures 8, 108, 109, 110, 111, 112, 113, 114, 123, 135; Map 4

Cochlembolus sanctus Crosby 1929:81 (male); Roewer 1942:660; Bonnet 1956:1175

Spirembolus chera Chamberlin and Ivie 1933:20 (female); Roewer 1942:665; Bonnet 1958:4122.

NEW SYNONYMY: confirmed by examination of the type (AMNH). This species was later (Chamberlin and Ivie 1945) synonymized, erroneously, with *Disembolus stridulans* Chamberlin and Ivie. *Cheraira salmonis* Chamberlin 1948:520 (female). **NEW SYNONYMY:** confirmed by examination of the type (AMNH).

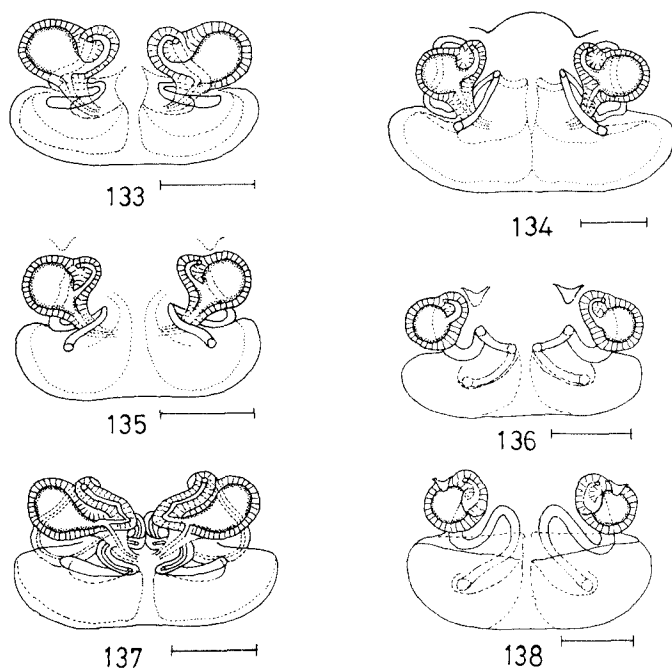
Type.—Holotype male from St. Johns, Utah, October 8, 1927 (R. V. Chamberlin); in AMNH, examined.

Description.—The female has been taken with the male on a number of occasions in several different localities, and there can be no real doubt as to its identity. Total length: female 2.0-2.1 mm, male 1.9-2.0 mm. Carapace: length: female/male 0.90 mm. Brown to orange-brown, with dusky markings and margins. Male carapace raised into a moderately large lobe with a longitudinal furrow (Figs. 109, 113); the lobe is clothed anteriorly with fairly short hairs. A male from Arizona, with identical sex organs and accompanied by a typical female of *S. sanctus*, has the lobe significantly broader than normal (Figs. 111, 114); it will be interesting to know if more specimens of this form turn up. Abdomen: grey; epigastric plates with weak striae or none in the female, but with clear, fairly widely spaced striae in the male. Sternum: brown, heavily suffused with black. Legs: orange-brown. Tibial spines: female 2221, male 0021, TmI: female 0.37-0.40, male 0.40-0.45. Male palp: Figs. 108, 110, 112; the tibia bears one stout spine. Female palp: tibia with 3 trichobothria, one small. Epigynum: Fig. 123; the distance apart and the size of the cusps show only small variations. Internal genitalia: Fig. 135.

Diagnosis.—The male of *S. sanctus* has a single lobe on the carapace, a single stout spine on the palpal tibia, and a small black tooth on the antero-ectal margin of the tibia. These characters place it with *S. kenus*, *S. crinitus*, *S. humilis* and *S. montanus* in the

Key. *S. sanctus* male is easily separated from *S. kenus* by the form of the palpal tibia, which is much shorter in *S. kenus* (Fig. 112 cf. Fig. 93), and by the larger diameter of the embolic coil in *S. kenus* (Fig. 108 cf. Fig. 92). *S. sanctus* is distinguished from *S. crinitus* by the somewhat shorter palpal tibia (Fig. 112 cf. Fig. 105), and by the somewhat smaller diameter of the embolic coil, *S. crinitus* having the embolus very similar in size to that of *S. montanus* (Fig. 119). *S. sanctus* male is separated from *S. humilis* by the larger lobe (Fig. 109 cf. Fig. 117), by the longer palpal tibia (Fig. 112 cf. Fig. 116), and by the larger diameter of the embolic coil (Fig. 110 cf. Fig. 115). *S. montanus* male differs from *S. sanctus* only in the larger diameter of the embolic coil (Figs. 108, 110 cf. Figs. 118, 119).

The female of *S. sanctus* has the epigynum generally similar in form to those of *S. kenus*, *S. castoris*, *S. bicavatus*, *S. crinitus*, *S. boreus*, *S. bipoculatus*, *S. sintalutus*, *S. montanus*, *S. dubiosus* and *S. apache*; the separation of these species is based on small differences in the epigyna. In *S. kenus* and *S. castoris* the posterior plate is longitudinally rather shorter than in *S. sanctus*, with the cusps closer together in *S. kenus* and larger in *S. castoris* (Fig. 123 cf. Figs. 95, 122). *S. bicavatus* (Fig. 125) also has the posterior plate somewhat shorter longitudinally than in *S. sanctus*, while the cusps are larger and closer together. *S. crinitus* (Fig. 107) has the posterior plate very similar to *S. sanctus*, but the cusps are minute and widely separated; *S. boreus* (Fig. 127) is also very similar to *S. sanctus*, but the epigynum is significantly larger (width of plate ca. 0.36–0.42 mm, cf. 0.25–0.30 mm for *S. sanctus* and *S. crinitus*). The epigyna of *S. sanctus* and *S. bipoculatus* (Fig. 126) differ only by the much larger cusps present in the latter species. In *S. sintalutus* (Fig. 128) the markings on the posterior plate are somewhat wavy as in *S. sacer*



Figs. 133–138.—Internal genitalia, females, ventral: 133, *S. ambiguus*; 134, *S. kenus*; 135, *S. sanctus*; 136, *S. bicavatus*; 137, *S. formicarius*; 138, *S. boreus*. (Scale lines 0.1 mm).

(Fig. 27), rather than smoothly curved as in *S. sanctus* (Fig. 123) and the cusps are slightly further apart. The epigynum of *S. montanus* is very close to that of *S. sanctus*; the cusps are rather closer together (Fig. 123, cf. Fig. 124), but whether this is a constant difference is uncertain. In *S. dubiosus* (Fig. 129) the cusps are smaller and closer together than in *S. sanctus*, and the outlines of the posterior plate and of the median septum are less clearly defined. In *S. apache* (Fig. 130) the median septum is broader than in *S. sanctus*, and the markings on the plate are more wavy than in *S. sanctus*.

Distribution.—This species has a wide distribution in the western half of N. America, and is one of the commoner species. It is recorded from British Columbia, Alberta, Oregon, Montana, Utah, Colorado, Wyoming and Arizona (Map 4). The records from British Columbia, Alberta and Oregon are based on females only, and need confirmation by the capture of males.

Natural History.—The female of this species has been taken much more frequently than the male. Males have been found in August, September and October, females in March-October; the main season of maturity seems to be in summer and autumn. The species has been recorded at both high and low altitudes, in a number of habitats: at the edge of snow at 2500-3000 m, under stones by the shore of a lake, in woodland.

Scotinotylus crinitus, new species

Figures 104, 105, 106, 107; Map 5

Type.—Holotype male from Red Feather Camp, 8200 ft., Colorado, September 21, 1946 (C. C. Hoff); deposited in AMNH.

Description.—The male and female were taken together. Total length: female 2.1-2.2 mm, male 2.0 mm. Carapace: length: female 0.90 mm, male 0.95 mm. Orange. Male carapace raised into lobe (Figs. 104, 106) which is almost identical with that of *S. sanctus*, but the hairs on the anterior face of the lobe are longer. Abdomen: grey; epigastric plates with weak striae in female, and with clear, rather widely spaced striae in male. Sternum: orange-yellow with dusky margins. Legs: orange-brown. Tibial spines: female 2221, male 0221 but weak. TmI: female 0.38-0.40, male 0.35. Male palp: generally similar to that of *S. sanctus*, but the tibia is longer (Fig. 105), and the embolic coil is fairly wide distally, as in *S. montanus* (Fig. 119). Female palp: tibia with 3 trichobothria, one very small. Epigynum: Fig. 107; the cusps are tiny and widely separated.

Diagnosis.—*S. crinitus* is closely related to *S. sanctus*, and its diagnosis is dealt with under that species.

Distribution.—Known only from the type locality (Map 5).

Natural History.—Both sexes were taken in September, at an altitude of about 2500 m; nothing was recorded on habitat.

Scotinotylus montanus, new species

Figures 118, 119, 120, 124; Map 4

Type.—Male holotype from Tioga Pass, California, 10,000 ft. altitude, September 22, 1961 (W. J. Gertsch and W. Ivie); deposited in AMNH.

Description.—Both sexes were taken together. Total length: female 2.0 mm, male 1.70-1.90 mm. Carapace: length: female 0.90-0.95 mm, male 0.82-0.90 mm. Orange-yellow to orange, with faint dusky markings. Male carapace raised into large lobe similar

to that of *S. sanctus*. Abdomen: grey; epigastric plates with very weak striae in female, with clear striae in male. Sternum: yellow, with grey reticulations and margins. Legs: orange-yellow. Tibial spines: female/male 2221, but spines on male tibiae I and II very short. TmI: female 0.37-0.45, male 0.41-0.43. Male palp: Figs. 118, 119, 120; the tibia has one stout spine. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 124.

Diagnosis.—*S. montanus* is closely related to *S. sanctus*, and its diagnosis is dealt with under that species.

Distribution.—Known only from two localities in California (Map 4)

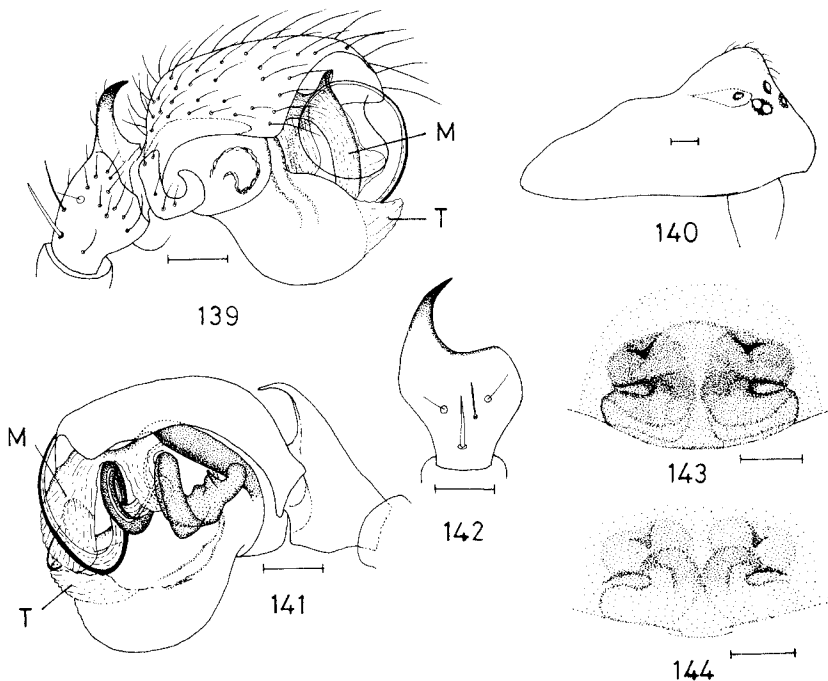
Natural History.—This species has been taken only at high altitudes (3000 m and above), and has been found under rocks. The male was taken in August and September, the female in September.

Scotinotylus humilis, new species

Figures 115, 116, 117; Map 4

Type.—Holotype male from Crater Lake National Park (?), Oregon, 1951 (Lowrie); deposited in AMNH.

Description.—The male type, the only specimen known, is in rather poor condition, with one palp and several limbs missing; the remaining palp is slightly expanded. Total length: male 1.80 mm. Carapace: length: male 0.85 mm. Deep brown, with dusky



Figs. 139-144.—*S. formicarius*: 139, male palp, ectal; 140, male carapace, lateral; 141, male palp, meso-ventral; 142, male palpal tibia, dorsal; 143, epigynum; 144, epigynum, pale specimen. Abbreviations: M, membranous part of supratregular apophysis; T, tegulum. (Scale lines 0.1 mm).

markings; raised into a rather shallow lobe (Fig. 117). In the type specimen, the anterior median eyes are poorly developed. Abdomen: grey; epigastric plates with weak, closely spaced striae. Sternum: deep brown. Legs: brown. Tibial spines: male 2221 but weak. TmI: male 0.37. Male palp: the embolic coil is rather small in diameter (Fig. 115), and the tibia is relatively short (Fig. 116).

Diagnosis.—This species is closely related to *S. sanctus*, and its diagnosis is dealt with under that species.

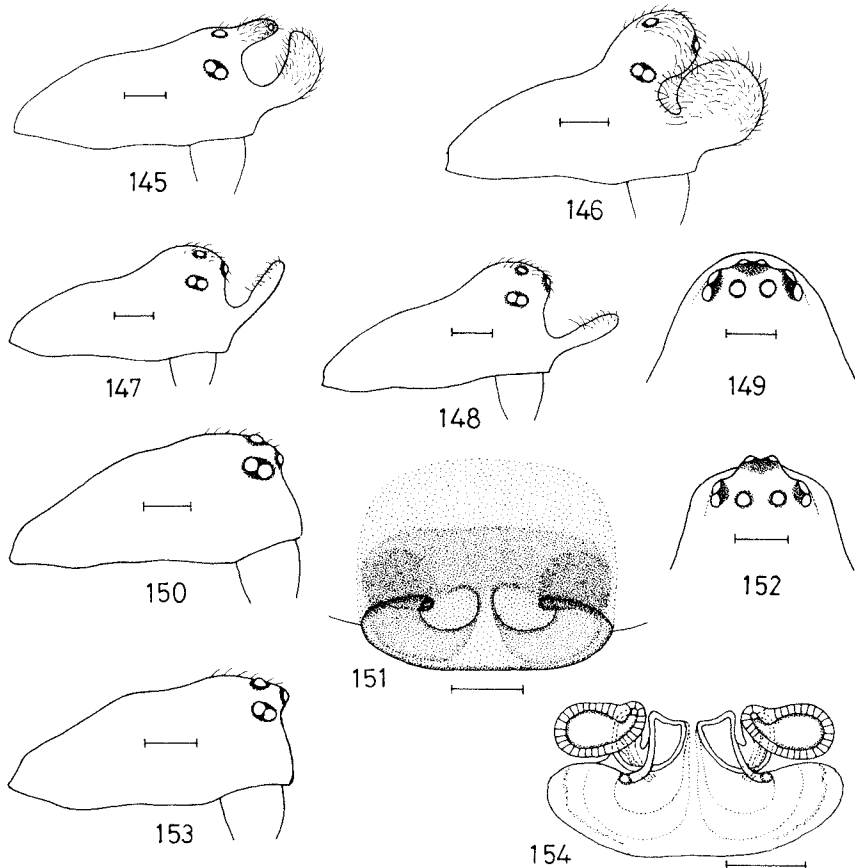
Distribution.—Known only from the type locality (Map 4).

Natural History.—Nothing recorded.

Scotinotylus bicavatus, new species

Figures 125, 136; Map 4

Type.—Holotype female from Paradise, Rainier National Park, Washington, September 12, 1965 (J. and W. Ivie); deposited in AMNH.



Figs. 145-154.—145, *S. bicornis*, male carapace, lateral; 146, *S. petulcus*, male carapace, lateral; 147, 148, *S. monoceros*, male carapace, lateral; 149, *S. monoceros*, female carapace, dorsal; 150, *S. monoceros*, female carapace, lateral; 151, *S. monoceros*, epigynum; 152, *S. bicornis*, female carapace, dorsal; 153, *S. bicornis*, female carapace, lateral; 154, *S. monoceros*, internal genitalia, female, ventral. (Scale lines 0.2 mm, except 151, 154, 0.1 mm).

Description.—Only the female is known. Total length: female 2.75 mm. Carapace: length: female 1.15 mm. Orange-brown, with dusky markings and margins. Abdomen: grey; epigastric plates with weak striae. Sternum: orange-brown, suffused with grey. Legs: orange-brown. Tibial spines: female 2221. TmI: female 0.40. Female palp: tibia with 3 trichobothria, one minute. Epigynum: Fig. 125; the cusps are large and fairly close together. Internal genitalia: Fig. 136.

Diagnosis.—*S. bicavatus* is closely related to *S. sanctus*, and its diagnosis is dealt with under that species.

Distribution.—Known only from the type locality (Map 4).

Natural History.—The female was taken in September; nothing was recorded on habitat.

Scotinotylus bipoculatus, new species

Figure 126; Map 4

Type.—Female holotype from Timberline Lodge, Mt. Hood, Oregon, September 16, 1949 (V. Roth); deposited in AMNH.

Description.—Only the female is known. Total length: female 2.55-2.70 mm. Carapace: length: female 1.15-1.20 mm. Orange, with dusky markings and margins. Abdomen: whitish grey; epigastric plates with weak, fairly closely spaced striae. Sternum: orange, with dusky margins. Legs: orange. Tibial spines: female 2221. TmI: female 0.45-0.47. Female palp: tibia with 3 trichobothria, one very small. Epigynum: Fig. 126; the cusps are fairly large.

Diagnosis.—*S. bipoculatus* is closely related to *S. sanctus*, and its diagnosis is dealt with under that species.

Distribution.—Known only from the type locality (Map 4).

Natural History.—The female was taken in September; nothing was recorded on habitat.

Scotinotylus boreus, new species

Figures 127, 138; Map 5

Type.—Female holotype from Whitemouth River, near Hadashville, Manitoba, May 10, 1966 (G. A. Bradley); deposited in CNC, Ottawa.

Description.—Only the female is known. Total length: female 3.0 mm. Carapace: length: female 1.25 mm. Orange-brown, somewhat darkened anteriorly. Abdomen: grey-black; epigastric plates with fairly clear, closely spaced striae. Sternum: orange-yellow, with dusky margins. Legs: orange. Tibial spines: missing. TmI: female 0.44-0.45. Female palp: tibia with 3 trichobothria. Epigynum: Fig. 127; the cusps are very small and widely separated. Internal genitalia: Fig. 138.

Diagnosis.—*S. boreus* is closely related to *S. sanctus*, and its diagnosis is dealt with under that species.

Distribution.—This species is known only from Manitoba and Alberta (Map 5).

Natural History.—The female has been taken in May and June. Habitats recorded were inside an anthill, inside the nest of *Formica obscuripes*, and in grassland (in a pitfall trap).

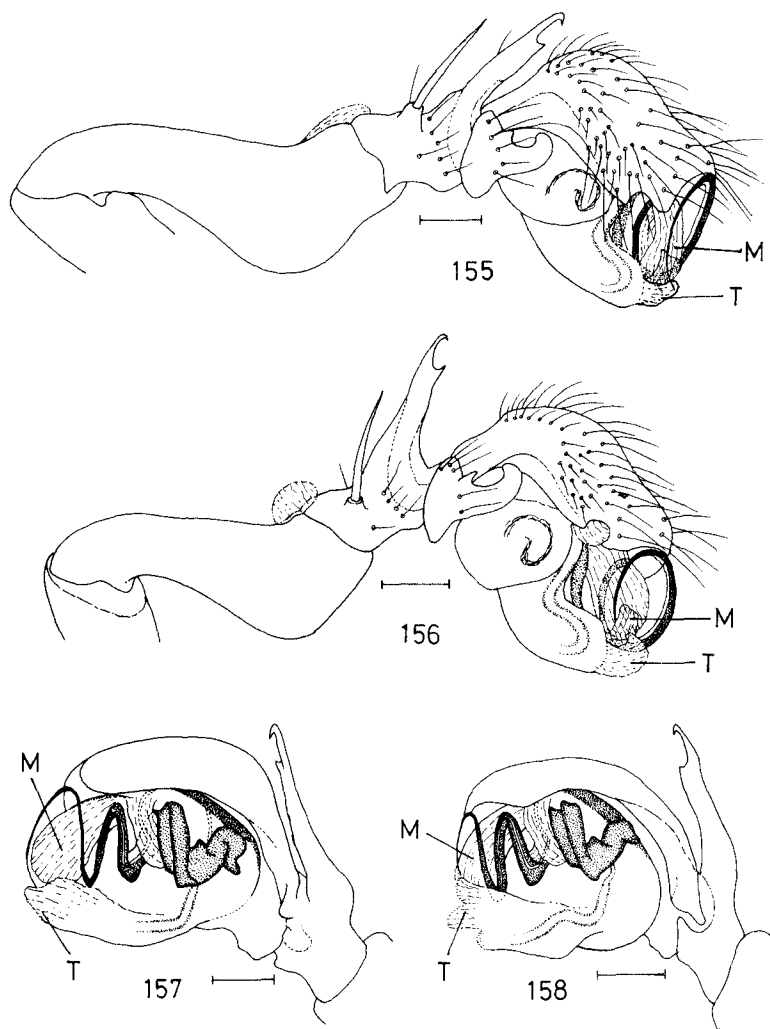
Scotinotylus sintalutus, new species

Figure 128; Map 5

Type.—Female holotype from Sintaluta, Saskatchewan, in pitfall trap, May 11 - June 13, 1963 (A. L. Turnbull); deposited in CNC, Ottawa.

Description.—Only the female is known. Total length: female 2.1 mm. Carapace: length: female 0.90 mm. Brown, with faint dusky markings. Abdomen: grey; epigastric plates smooth. Sternum: pale yellow with dusky markings. Legs: yellow-brown. Tibial spines: female 2221. TmI: female 0.40. Female palp: tibia with 3 trichobothria, one very small. Epigynum: Fig. 128.

Diagnosis.—*S. sintalutus* is closely related to *S. sanctus*, and its diagnosis is dealt with under that species.



Figs. 155-158.—155, *S. monoceros*, male palp, ectal; 156, *S. bicornis*, male palp, ectal; 157, *S. monoceros*, male palp, meso-ventral; 158, *S. bicornis*, male palp, meso-ventral. Abbreviations: M, membranous part of suprategular apophysis; T, tegulum. (Scale lines 0.1 mm).

Distribution.—Known only from the type locality (Map 5).

Natural History.—The female was taken in May-June, in a pitfall trap in grassland.

Scotinotylus dubiosus, new species

Figure 129; Map 4

Type.—Female holotype from Logan, Utah, April 30, 1948 (G. F. Knowlton); deposited in AMNH.

Description.—Only the female is known. Total length: female 2.0 mm. Carapace: length: female 0.90 mm. Orange-brown, with dusky markings and margins. Abdomen: grey-black; epigastric plates smooth. Sternum: orange-brown, with blackish margins. Legs: orange-brown. Tibial spines: mostly missing. TmI: female 0.37. Female palp: tibia with 3 trichobothria, one small. Epigynum: Fig. 129.

Diagnosis.—*S. dubiosus* is diagnosed by the epigynum, which is of the same general form as that of *S. sanctus*; see *S. sanctus* diagnosis.

Distribution.—Known only from the type locality (Map 4).

Natural History.—The only female was taken in April; nothing was recorded on habitat.

Scotinotylus apache (Chamberlin), new combination

Figure 130

Disembolus apache Chamberlin 1948:527 (Fig. 162, not Fig. 163)

Type.—Female holotype from (?) Willow Creek, near Burchill's Ranch, Arizona, October 1928; in AMNH, examined.

Description.—This species is known only from the holotype, which is in very poor condition. All that remains is a legless carapace and some fragments of abdomen, but fortunately the epigynum is still present. The description given here is therefore very incomplete. Total length: 2 mm (according to Chamberlin). Carapace: length: female 0.70 mm. Brown, with dusky markings. Female palp: tibia with 3 trichobothria. Epigynum: Fig. 130; the median septum is rather broad, and the markings on the plate are slightly wavy. Clearing of the epigynum shows that the spermathecal ducts follow more or less the same course as in *S. sanctus*.

Diagnosis.—*S. apache* is closely related to *S. sanctus*, and its diagnosis is dealt with under that species.

Distribution.—Known only from the type locality; it has not been possible to identify this locality, and hence no map is given for this species.

Natural History.—The female was taken in October; nothing was recorded on habitat.

Scotinotylus formicarius (Dondale and Redner), new combination

Figures 7, 15, 137, 139, 140, 141, 142, 143, 144; Map 5

Cochlembolus formicarius Dondale and Redner 1972:1644

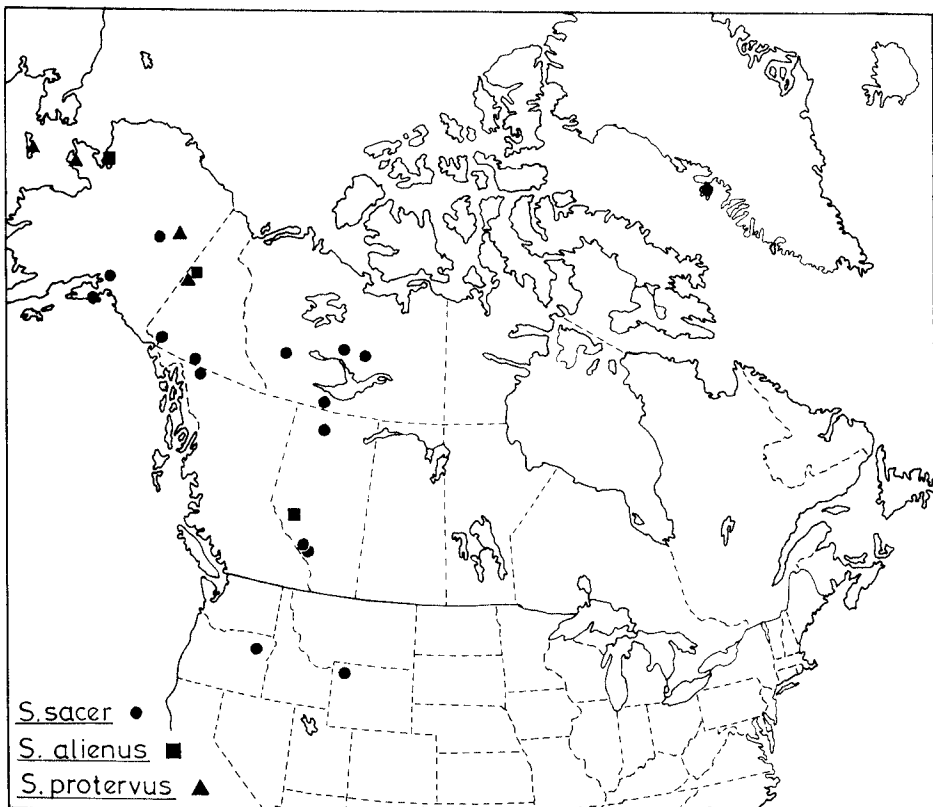
Type.—Male holotype from Bellingham, Washington, May 12, 1971 (G. D. Alpert); in AMNH, examined.

Description.—Total length: female 2.5-3.0 mm, male 2.0-2.35 mm. Carapace: length: female/male 1.1 mm. Orange-brown to brown. Male carapace raised into shallow lobe (Fig. 140), with the clypeus projecting. Abdomen: grey-black; epigastric plates weakly striated in female, more strongly so in male. Sternum: orange-yellow, reticulated with grey. Legs: orange to orange-yellow. Tibial spines: female/male 1111, but very short on tibiae I in male. TmI: female 0.47, male 0.43-0.46. Male palp: Figs. 139, 141, 142; the tibia has one stout spine. Female palp: tibia with 2 trichobothria. Epigynum: Figs. 143, 144; rather pale-colored in some specimens. The internal ducts follow a sinuous course (Fig. 137).

Diagnosis.—The male of *S. formicarius* is diagnosed by the presence of a single stout spine on the palpal tibia, coupled with the form of the palpal tibia (Fig. 142), of the palp (Fig. 139) and of the carapace (Fig. 140). The female differs from all other species in the genus by the tibial spinal formula (1111, cf. 2221 for the other species), and the identity is confirmed by the epigynum (Figs. 143, 144).

Distribution.—This species is known from a number of localities in Washington (Dondale and Redner 1972), and from Wyoming (Map 5).

Natural History.—Males and females were taken in March, April, May and September. Its habitat seems to be the nests of ants (*Formica obscuripes* Forel), though this habitat was not mentioned for the Wyoming specimens.



Map 1.—Distributions of *S. sacer*, *S. alienus* and *S. protervus* in North America

Scotinotylus bodenburgi (Chamberlin and Ivie), new combination

Figure 131; Map 5

"Erigone" bodenburgi Chamberlin and Ivie 1947:38

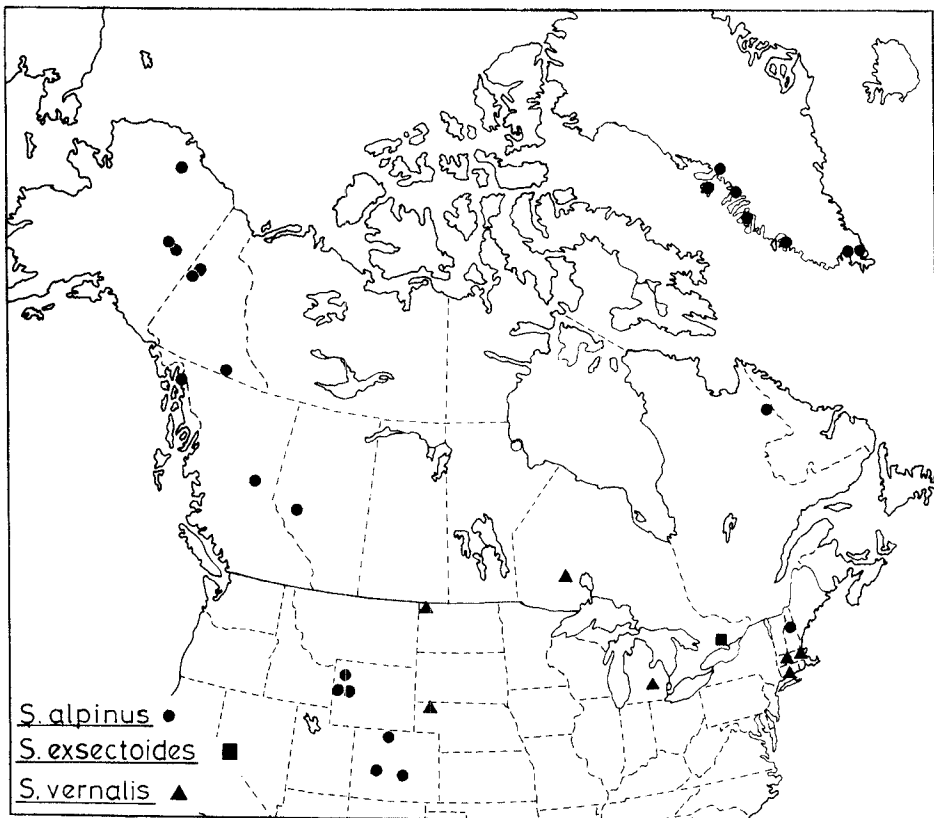
Type.—Holotype female from Matanuska, Bodenburg Butte, Alaska, June 2, 1945 (J. C. Chamberlin); in AMNH, examined.

Description.—Only the female is known. Total length: female 1.70 mm. Carapace: length: female 0.70 mm. Orange, with dusky markings and margins. Abdomen: grey; epigastric plates smooth. Sternum: orange-yellow, suffused with grey. Legs: orange-brown. Tibial spines: female 2221. TmI: female 0.40. Female palp: tibia with 3 trichobothria. Epigynum: Fig. 131; very pale in color, with small, widely spaced cusps which point forwards like arrowheads.

Diagnosis.—The female of *S. bodenburgi* is grouped with *S. sagittatus* by the form of the epigynum, which has 2 forward-directed cusps (Fig. 131). These two species have very similar epigyna, which are however separable: the cusps of *S. bodenburgi* are both smaller and further apart than those of *S. sagittatus* (Fig. 132). In addition, the palpal tibia of *S. bodenburgi* has 3 trichobothria, while that of *S. sagittatus* has only 2; this difference may not however be constant.

Distribution.—Known only from the type locality (Map 5).

Natural History.—The female was taken in June; nothing was recorded on habitat.



Map 2.—Distributions of *S. alpinus*, *S. exsectoides* and *S. vernalis* in North America

Scotinotylus sagittatus, new species

Figure 132; Map 5

Type.—Female holotype from Mt. Washburn (north of summit), Wyoming, August 13, 1940 (W. Ivie); deposited in AMNH.

Description.—Only the female is known. Total length: female 1.80 mm. Carapace: length: female 0.80 mm. Orange-brown, with dusky markings and margins. Abdomen: grey; epigastric plates with very weak striae. Sternum: orange-yellow, with dusky margins. Legs: yellow-brown. Tibial spines: female 2221. TmI: female 0.40. Female palp: tibia with 2 trichobothria. Epigynum: Fig. 132; pale in color, with cusps pointing forwards like arrowheads.

Diagnosis.—*S. sagittatus* has the epigynum similar to that of *S. bodenburgi*, and its diagnosis is dealt with under that species.

Distribution.—Known only from the type locality (Map 5).

Natural History.—The female was taken in August, at a high altitude (ca. 3150 m); the habitat was not recorded.

Scotinotylus monoceros (Simon), new combination

Figures 9, 147, 148, 149, 150, 151, 154, 155, 157; Map 5

Delorhhipis monoceros Simon 1884:697

Erigone monoceros: Keyserling 1886:156

Coreorgonal monoceros: Bishop and Crosby 1935:219; Roewer 1942:621; Bonnet 1956:1203

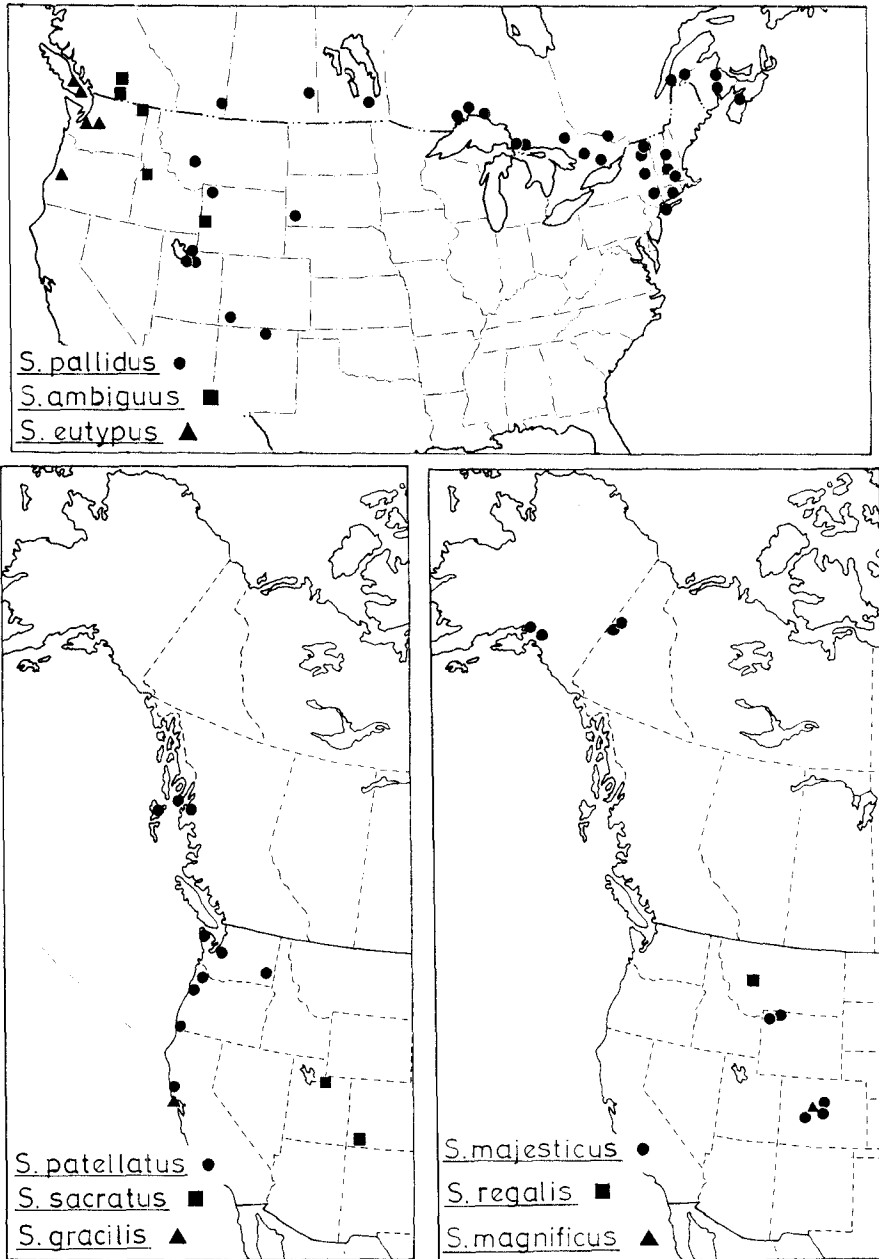
Cheraira willapa Chamberlin 1948:518 **NEW SYNONYMY.** The type of this species cannot be found, but there are 2 vials (unnamed as to species) in AMNH which correspond in locality and date with those given under "Other records" (Chamberlin 1948:519): the specimens in these vials are *S. monoceros* females. Chamberlin's figure 116 also corresponds well with *S. monoceros*.

Type.—Type locality, Washington Territory.

Description.—Total length: female/male 2.5-2.6 mm. Carapace: length: female 1.2-1.3 mm, male 1.35-1.55 mm (including the horn). Orange, with faint dusky markings. The ocular area of the female does not project significantly over the clypeus (Figs. 149, 150). The male carapace is elevated anteriorly, but there is no actual lobe; a "horn" projects from the clypeus, at an angle which is somewhat variable (Figs. 147, 148). Abdomen: grey to black; epigastric plates smooth. Sternum: orange, reticulated with black, and with black margins. Legs: orange-brown. Tibial spines: female 2221, male 0011. TmI: female 0.65-0.70, male 0.58-0.63. Male palp: Figs. 155, 157. The tibia bears one very stout spine, and the tibial apophysis is long and hooked distally. The patella is long and swollen distally on the ventral side, and there is a white membranous extrusion meso-dorsally between patella and tibia. Female palp: tibia with 3 trichobothria, one small. Epigynum: Fig. 151; internal genitalia Fig. 154.

Diagnosis.—The male of *S. monoceros* can be diagnosed at once by the form of the carapace, which has a rod-like apophysis (the "horn") projecting from the clypeus (Figs. 147, 148), coupled with the form of the palp (Fig. 155). The palp shows only minor differences from those of *S. bicornis* (Fig. 156) and *S. petulcus*. The female is diagnosed by the epigynum, which has neither cusps nor a process arising from the anterior margin (Fig. 151). *S. ambiguus* female falls into the same section of the key, but the epigyna of these two species are quite distinct (Fig. 151 cf. Fig. 121) and confusion is impossible. The epigynum of *S. monoceros* is structurally indistinguishable from the of *S. bicornis*

(and possibly also from that of *S. petulcus* when this is discovered). *S. monoceros* and *S. bicornis* females may however be separable by the form of the carapace: the ocular area projects over the clypeus to a greater extent in *S. bicornis* than in *S. monoceros* (Figs. 149, 150 cf. Figs. 152, 153); more specimens of *S. bicornis* female (taken in company with the male) are required to establish whether this difference is reliable.



Map 3.—Distributions of *S. pallidus*, *S. ambiguus*, *S. eutypus*, *S. patellatus*, *S. sacratus*, *S. gracilis*, *S. majesticus*, *S. regalis* and *S. magnificus* in North America

Distribution.—This appears to be a relatively common species in the western coastal region; there are records from British Columbia, Washington, Oregon and California, but also two records from Idaho (Map 5).

Natural History.—The males appear to be much less frequent than the females, and presumably have a shorter season of maturity. Males have been taken in January-April and August-November, and females in every month of the year. The only habitats mentioned are in a seepage area beside a creek, in a cave, and in fir needles.

Scotinotylus bicornis (Emerton), new combination

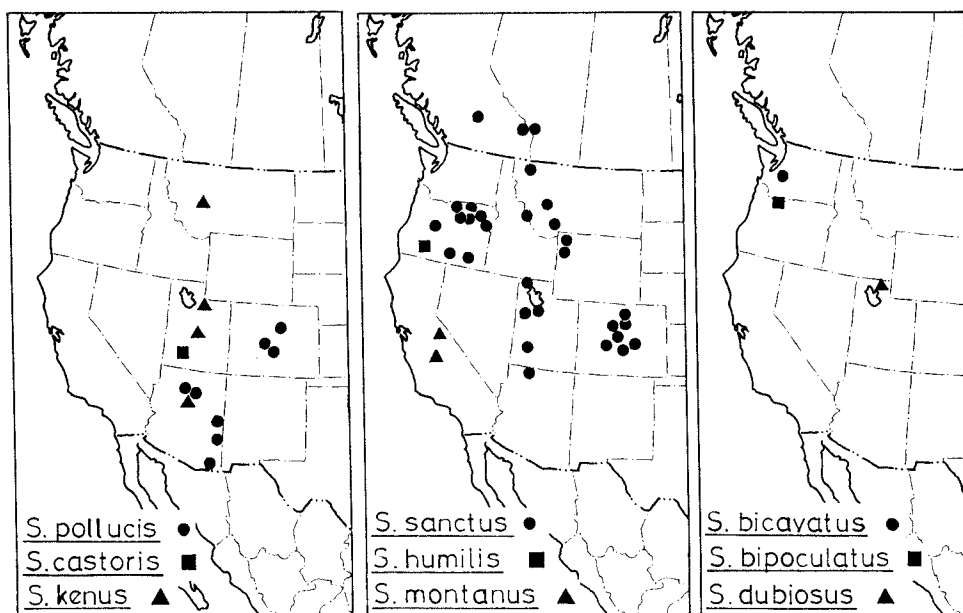
Figures 145, 152, 153, 156, 158; Map 5

Delorhhipis bicornis Emerton 1923:242

Coreorgonal bicornis: Bishop and Crosby 1935:218; Roewer 1942:621; Bonnet 1956:1203

Type.—Male type from Terrace, British Columbia, October 1923 (Mrs. Hippisley); in MCZ, examined.

Description.—Total length: female 2.70-3.0 mm, male 2.8 mm. Carapace: length: female 1.1-1.25 mm, male 1.45 mm. Orange to chestnut-brown, with dusky markings. In the female, the ocular area protrudes slightly over the clypeus (Figs. 152, 153). The male carapace (Fig. 145) has 2 distinct lobes, one carrying the anterior median eyes, the other arising from the clypeal region; both lobes bear numerous short bristly hairs. Abdomen: grey to black; epigastric plates smooth. Sternum: orange, reticulated with black, and with black margins. Legs: orange-brown. Tibial spines: female 2221, male 0111, but spine on tibia II very short. TmI: female 0.52-0.60, male 0.55-0.57. Male palp: Figs. 156, 158. The tibia bears one very stout spine, and the tibial apophysis is long and hooked distally. The patella is long and swollen distally on the ventral side, and there is a white mem-



Map 4.—Distributions of *S. pollucis*, *S. castoris*, *S. kenus*, *S. sanctus*, *S. humilis*, *S. montanus*, *S. bicavatus*, *S. bipoculatus* and *S. dubiosus* in North America

braneous extrusion between patella and tibia. Female palp: tibia with 3 trichobothria, one small. Epigynum: not distinguishable from that of *S. monoceros*.

Diagnosis.—The male of *S. bicornis* can be diagnosed readily by the form of the carapace (Fig. 145), coupled with the form of the palp (Fig. 156). The female of *S. bicornis* cannot be distinguished from *S. monoceros* by the epigynum, but may be separable by the form of the carapace (see *S. monoceros* diagnosis).

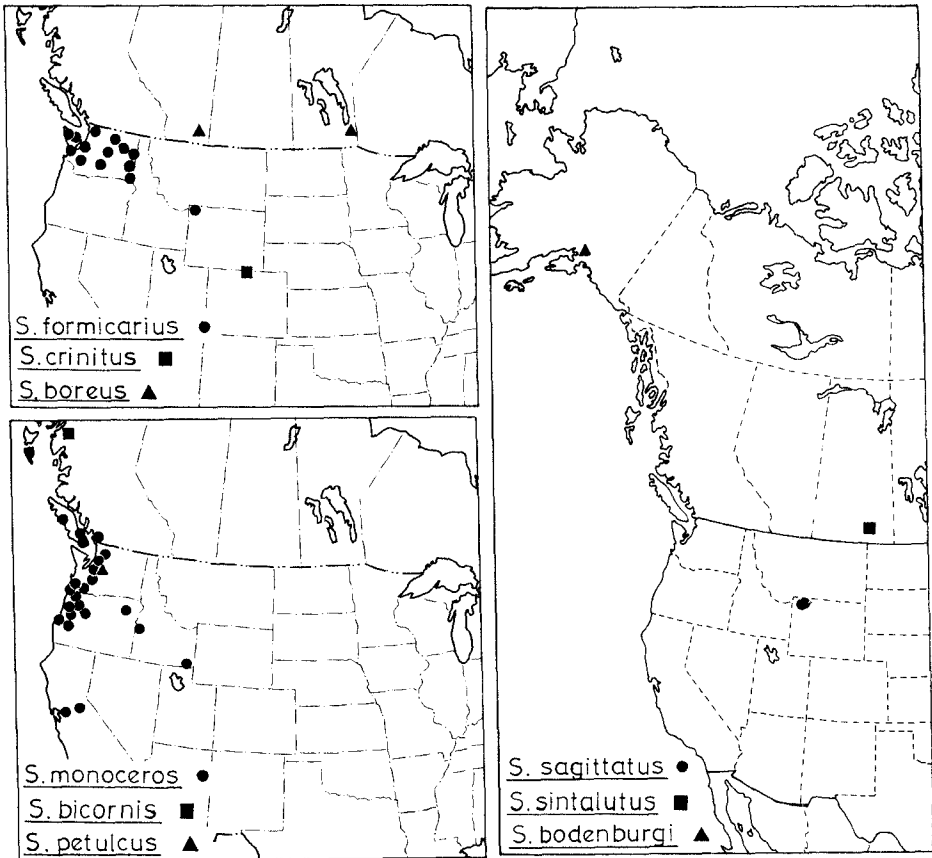
Distribution.—This species is rare in comparison *S. monoceros*, the only records being from the type locality, at an altitude of ca. 1400 m (Map 5).

Natural History.—This species will probably prove to have a more northerly distribution than *S. monoceros*. The males were taken in October, the females in June and October. The only habitat given (for a single female) is on moss on a rockslide.

Scotinotylus petulcus, new species

Figure 146; Map 5

Type.—Male holotype from Denny Creek, Snoqualine Pass, Washington, September 16, 1935 (Chamberlin and Ivie); deposited in AMNH.



Map 5.—Distributions of *S. formicarius*, *S. crinitus*, *S. boreus*, *S. monoceros*, *S. bicornis*, *S. petulcus*, *S. sagittatus*, *S. sintalutus* and *S. bodenburgii* in North America

Description.—Only the male is known. Total length: male 2.55 mm. Carapace: length: male 1.42 mm. Orange-brown, raised anteriorly into a lobe which carries the posterior and anterior median eyes, and with a large, almost spherical lobe arising from the clypeus (Fig. 146); both lobes are furnished with numerous short bristly hairs. Abdomen: black; epigastric plates smooth. Sternum: orange, suffused with black. Legs: orange. Tibial spines: male 0011, very short. TmI: male 0.63-0.67. Male palp: not distinguishable from that of *S. monoceros*.

Diagnosis.—The male of *S. petulcus* can be diagnosed at once by the unique form of the carapace, with the large bulbous projection from the clypeus (Fig. 146). The palp is practically identical in form to those of *S. monoceros* and *S. bicornis*. The female is unknown, but is likely to be closely similar to the females of *S. monoceros* and *S. bicornis*.

Distribution.—Known only from the type locality (Map 5).

Natural History.—Two males were taken in September; nothing was recorded on habitat.

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